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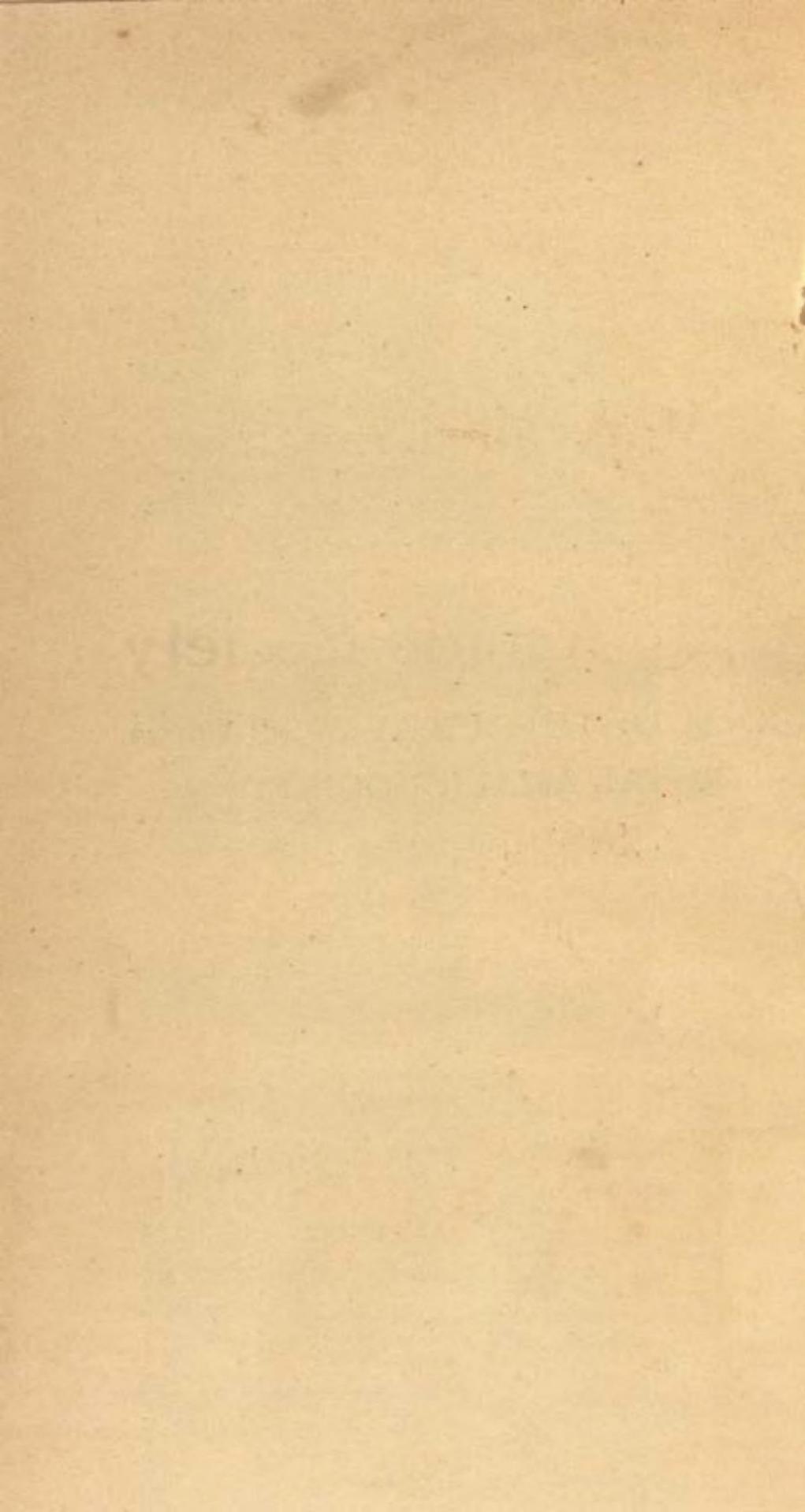




JOURNAL OF THE MALAYAN BRANCH,
ROYAL ASIATIC SOCIETY.



(301)





JOURNAL

of the

Malayan Branch

of the

Royal Asiatic Society

25075

Vol. XI.

1933.

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1933

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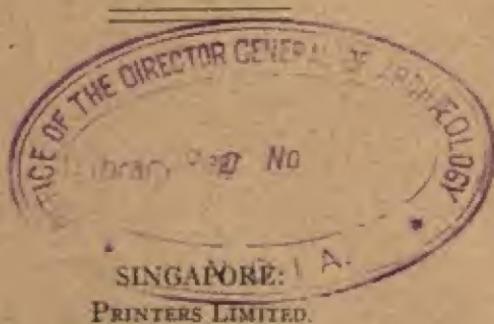
of the

Malayan Branch

of the

Royal Asiatic Society

March, 1933



1933

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The
Malayan Branch
of the
Royal Asiatic Society.

Patron.

H. E. SIR CECIL CLEMENTI, G.C.M.G., Governor of the Straits Settlements, High Commissioner for the Malay States, British Agent for Sarawak and North Borneo.

Council for 1933.

THE HON. MR. R. O. WINSTEDT, C.M.G., D.LITT.	President.
THE HON. MR. C. E. WURTZBURG, M.C. MR. W. M. MILLINGTON	Vice-Presidents for the S.S.
THE HON. MR. M. B. SHELLEY	Vice-Presidents for the F.M.S.
THE HON. MR. JUSTICE J. V. MILLS	
THE HON. MR. C. C. BROWN ENGKU ABDUL-ASIZ, D.K. . . . MR. W. LINEHAN	Vice-Presidents for the U.M.S.
MESSRS. R. E. HOLTTUM, W. MARSH, E. N. TAYLOR AND DR. A. L. HOOPS, C.B.E.	Councillors.
MR. M. R. HENDERSON	Hon. Treasurer.
MR. F. N. CHASEN	Hon. Secretary and Editor.

PROCEEDINGS
OF THE
ANNUAL GENERAL MEETING.

The Annual General Meeting of the Society was held at the Raffles Museum, Singapore, at 4.45 p.m. on 28th February, 1933.

A Vice-President, THE HON. MR. C. E. WURTZBURG, M.C., in the Chair.

1. The Minutes of the Annual General Meeting held on 29th February, 1932, were read and confirmed.
2. The Annual Report and Accounts as submitted by the Council were adopted.
3. The Officers and Council for 1933 were elected.
4. A vote of thanks was passed to H. H. The Sultan of Johore, D.K., G.C.M.G., K.B.E., for his generosity in supporting the publications of the Society in 1932 and the establishment of an annual grant to the Society's funds beginning in 1933.

F. N. CHASEN,
Hon. Secretary.

Annual Report

OF THE

Malayan Branch, Royal Asiatic Society

for 1932.

Membership. At the end of the year the membership roll included 653 names compared with 647 at the end of 1931. The roll was composed of 17 Honorary Members, 2 Corresponding Members and 634 Ordinary Members. By resignation and death the Society lost 28 members. The following 34 new members were elected:—

Abdul Haji bin H. Hassan	Malacca Historical Society
Abdul Hamid bin Unku Abdul Majid, Unku	McMullin, C. A. MacDonald
Baker, J.	Millard, E. B.
Barrett, E. C. G.	Miller, N. C. E.
Brant, R. V.	Newbold, Hon. Mr. E.
Bryson, H. P.	Nolli, Cav. R.
Burnett, W. I. T.	Phillipps, A. E.
Calder, J.	Pretty, E.
English School, Muar	Raja Ratnam, A.
Gardner, G. B.	Rawlings, G. S.
Hayward, M. J.	Somerville, D. A.
Hughes, T. D.	Thurston, F. B.
Jackson, G. M. R.	Trumble, D. H.
Joachim, E. J.	Tweedie, M. W. F.
Joynt, H. R.	Watherston, D. C.
Lee Chim Tuan	Wong, S. Q.
Longfield, J. E.	Yeh Hua Fen.

The Society's rules regarding the conditions of membership are rigidly enforced and no name is retained on the roll, if at the close of a year the subscription for the previously year remains unpaid.

Annual General Meeting. The Annual General Meeting was held in the Raffles Museum on 29th February. It was preceded by a General Meeting.

Council. The Council as elected at the Annual General Meeting remained in office for the whole year.

Journals. Three journals were issued. The volume consisted of pp. i-xxxii; 1-690; and 57 plates.

The January journal was a miscellaneous number and contained a series of articles concerning the archaeology, prehistory, history and ethnology of Malaysia. The April journal was devoted to "A Malay History of Riau and Johore" by the President, Dr. R. O. Winstedt, C.M.G., D.LITT. The last part for the year was the same author's "A History of Johore" (1365-1895 A.D.).

Finance. The last of a series of annual contributions to the Society's funds by the Governments of the S.S. and F.M.S. was made in 1932 in the form of \$500 from the former Government. It is therefore especially pleasing to record the very generous action of Johore in making provision for an annual contribution of \$250 starting in 1933. The Society is very grateful for the personal interest shewn in this connection by H. H. Colonel Sir Ibrahim, D.X., S.P.M.J., G.C.M.G., K.B.E., Sultan of Johore to whom it is also indebted for a timely gift of \$700 towards the cost of publication of the December journal.

General. The Council feels justified in recording that the past year has been one of the most successful in the Society's career. In spite of the general economic depression the Society maintained its membership; by an exceptionally heavy sale of journals, the receipts for the year were much greater than those of the previous year; and, most important of all, a large, well-illustrated volume represents an unprecedented heavy printing and publishing programme.

In 1933 the Council hopes to provide a volume with a biological bias.

F. N. CHASEN,
Hon. Secretary.

1st February, 1933,
SINGAPORE.

MALAYAN BRANCH, ROYAL ASIATIC SOCIETY.

Receipts and Payments for the year ending 31st December, 1932.

RECEIPTS.

Cash.

Balance at Mercantile Bank Jan. 1st,
1932

Petty Cash in hand, Jan. 1st, 1932 ..
9.01

Subscriptions
For the year 1930

" " 1931

" " 1932

" " 1933

" " 1934 & etc.

Subscriptions
Sales of Maps and Journals

Government Grants.

Straits Settlements

Johore Government

Interest.

On Investments

On Current Account

\$4,078.32
9.01
\$4,087.33

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PAYMENTS.

Printing.

Journal Vol. 9 pt. 2	\$ 833.75
Journal Vol. 10 pt. 1	1,259.25
Journal Vol. 10 pt. 2	1,898.50
Blocks	408.57
Separates	296.51
Illustrations	1,332.82
Annual Report and Index	50.25
	\$6,079.65
Stationery	90.84
Postage and other expenses	245.11
Salaries	558.00
Cheque Commission, Stamps and Cheque Books	28.51
Balance at Mercantile Bank on 31st Dec., 1932	3,111.08
Petty Cash in hand on 31st Dec., 1932	13.90
	\$10,127.09

E. H. CORNER,
Hon. Treasurer, M. B. R. A. S.

List of Members for 1933.

(As on 1st January, 1933.)

*Life Members.

Patron.

1930. Clementi, H. E. Sir Cecil, G.C.M.G.

Honorary Members.

Year of
Election.

- 1903, 1923. Abbott, Dr. W. L., Northeast Maryland, U.S.A.
1890, 1918. Blagden, Dr. C. O., School of Oriental Studies,
Finsbury Circus, London.
1921. Brandstetter, Prof. Dr. R., Luzern, Switzerland.
1930. Clifford, Sir Hugh, G.C.M.G., G.B.E., c/o The Crown
Agents, 4, Millbank, London. (Patron, 1927).
1930. Crosby, Sir Josiah, K.B.E., c/o H. B. M. Consulate,
Panama.
1903, 1917. Galloway, Sir D. J., The British Dispensary, Singa-
pore. (Vice-President, 1906-7; President, 1908-
13).
1895, 1920. Hanitsch, Dr. R., 99, Woodstock Road, Oxford,
England. (Council 1897-1919; Hon. Tr., 1898-
1906, 1910-11, 1914-19; Hon. Sec., 1912-13).
1922. Johore, H. H. The Sultan of, D.K., G.C.M.G., K.B.E.,
Johore.
1900, 1932. Kloss, C. Boden, 2, Holbein House, Sloane Square,
S.W., London. (Council, 1904-8, 1923, 1927-8;
Vice-President, 1920-1, 1927; Hon. Secretary,
1923-6; President, 1930).
1903, 1927. Maxwell, Sir W. G., K.B.E., C.M.G., 123, Oakwood
Court, Kensington, W.14, London. (Council,
1905, 1915; Vice-President, 1911-12, 1916, 1918,
1920; President, 1919, 1922-3, 1925-6).
1921. Perak, H. H. The Sultan of, K.C.M.G., K.C.V.O., Istana
Negara, Kuala Kangsar, Perak.
1890, 1912. Ridley, H. N., C.M.G., F.R.S., 7, Cumberland Road,
Kew Gardens, Surrey, England.
1916. Sarawak, H. H. The Rajah of, G.C.M.G., Kuching,
Sarawak.

- 1894, 1921. Shellabear, The Rev. Dr. W. G., 185, Girard Avenue, Hartford, Conn., U.S.A. (Council, 1896-1901, 1904; Vice-President, 1913; President, 1914-18).
 1921. Snouck-Hurgronje, Prof. Dr., Leiden, Holland.
 1921. Van Ronkel, Dr. P. H., Zoeterwoudsche Singel 44, Leiden, Holland.
-

Corresponding Members.

1920. Laidlaw, Dr. F. F., Eastfield, Uffculme, Devon, England.
 1920. Merrill, Dr. E. D., New York Botanical Garden, Bronx Park, New York City, U.S.A.
 1925, 1933. Callenfels, Dr. P. van Stein, c/o Archaeological Survey of Netherlands India, Batavia, Java.
-

Ordinary Members.

- *1921. Abdul Aziz, D.K., Engku, Johore Bahru, Johore.
- 1927. Abdul Ghani bin Mohamed, Dr., The Hospital, Kuala Selangor.
- 1932. Abdul Hamid bin Engku Abdul Majid, Engku c/o State Secretariat, Johore Bahru, Johore.
- 1926. Abdul Hamid bin Dato Kaya, Dato, Klang, Selangor.
- 1926. Abdul Hamid bin Hussain, District Office, Pasir Mas, Kelantan.
- 1918. Abdul Majid bin Haji Zainuddin, Haji, 2, Treacher Road, Kuala Lumpur, Selangor.
- 1926. Abdul Malek bin Mohamed Yusuf, District Office, Kuala Klawang, Jelebu.
- 1926. Abdul Rahman bin Yassin, 3, Jalan Chat, Johore Bahru, Johore.
- 1932. Abdulhadi bin H. Hassan, Inspector of Malay Schools, Kelantan.
- *1923. Abdullah bin Jaafar, Dato, Siglap, Singapore.
- 1916. Abraham, H. C., Revenue Survey Office, Taiping, Perak.
- *1907. Adams, Sir A., K.B.E., Rockleigh, Swanage, Dorset, England. (Vice-President, 1919).
- *1909. Adams, The Hon. Mr. T. S., The Residency, Kuala Lumpur, Selangor.
- *1919. Adelborg, F., Consul General of Sweden, Malacca Street, Singapore.
- 1926. Ahmad bin Osman, District Office, Temerloh, Pahang.
- 1927. Allen, B. W., Police Depot, Singapore.
- 1914. Allen, H. C. W., Boustead & Co., Ltd., Singapore.
- 1927. Alor Star Government English School Union, Alor Star, Kedah.
- 1930. Altson, R. A., Department of Agriculture, Kuala Lumpur, Selangor.

1926. Anderson, Capt. H. A., Commissioner of Police, Kota Bahru, Kelantan.
1921. Andreini, Capt. E. V., Sarawak.
1926. Ariff, Dr. K. M., 47, Leith Street, Penang.
1908. Arthur, J. S. W., Secretary for Postal Affairs, S.S. and F.M.S., Kuala Lumpur, Selangor.
1926. Atkin-Berry, H. C., Swan & Maclarens, Singapore.
1926. Augustine, J. F., Government English School, Alor Star, Kedah.
- *1908. Ayre, C. F. C., Ipoh, Perak.
- *1926. Bagnall, Hon. Mr. J., The Straits Trading Co., Singapore.
- *1919. Bailey, A. E., Keecha, Park Road, Leamington Spa, England.
- *1926. Bailey, John, British Vice-Consulate, Nakawn Lampang, Siam.
1915. Bain, Norman K., District Office, Telok Anson, Perak.
1926. Bain, V. L., Forest Department, Bentong, Pahang.
- *1912. Baker, A. C., Land Office, Alor Star, Kedah. (Council, 1928; Vice-President, 1931).
1932. Baker, James, Agricultural Office, Muar.
- *1899. Banks, J. E., Ambridge, Penn., U.S.A.
1920. Barbour, Dr. T., Museum of Comparative Zoology, Harvard University, Cambridge, Mass., U.S.A.
1932. Barrett, E. C. G., Civil District Court, Singapore.
1914. Bazell, C., Malay College, Kuala Kangsar, Perak. (Hon. Librarian, 1916-20; Hon. Treasurer, 1921-22).
1925. Bee, R. J., Public Works Department, Ipoh, Perak.
1921. Belgrave, W. N. C., Department of Agriculture, Kuala Lumpur, Selangor.
- *1910. Berkeley, Capt. H., 1.S.O., Clink Gate, Droitwich, England.
1930. Berney, H. A., c/o The Chartered Bank, Ipoh, Perak.
1927. Best, G. A., Botanical Gardens, Singapore.
- *1912. Bicknell, J. W., U. S. Rubber Plantations, Medan, Sumatra.
1884. Bicknell, W. A., 2, Phillips Avenue, Exmouth, Devon, England.
1924. Bird, R., Government Offices, Penang.
1931. Birse, A. L., Kuala Trengganu, Trengganu.
1926. Birtwistle, W., Fisheries Department, Singapore.
- *1908. Bishop, Major C. F.
- *1923. Black, J. G., c/o The Colonial Secretariat, Singapore.
1921. Blaek, Major K., General Hospital, Singapore.
1926. Blackburn, H. K., Malim Nawar South Ltd., Malim Nawar, Perak.
- *1923. Blacker, Dr. G. O., "Sentosa," Brooklands Road, Sale, Manchester, England.
1884. Bland, R. N., c.m.g., 25, Earl's Court Square, London, S.W.5. (Council, 1898-1900; Vice-President, 1907-9).
1921. Blasdell, Rev. R. A., Paya Rumput, Malacca.
1925. Blythe, W. L., Chinese Protectorate, Singapore.

- *1926. Boswell, A. B. S., Forest Department, Taiping, Perak.
- 1910. Boult, F. F., c/o Sarawak Government Offices, Millbank House, Westminster, S.C.1.
- 1930. Boulter, R., c.m.g., Fullerton Building, Singapore.
- *1919. Bourne, F. G., Coroner's Office, Singapore.
- 1921. Boyd, R., Co-operative Societies Dept., Kuala Lumpur, Selangor.
- 1928. Boyd, Mr. Justice T. Stirling, Kuching, Sarawak.
- *1919. Boyd, W. R., c/o Federal Secretariat, Kuala Lumpur, Selangor.
- 1913. Braddell, R. St. J., c/o Braddell Brothers, Singapore.
- 1932. Brant, R. V., c/o Federal Secretariat, Kuala Lumpur, Selangor.
- 1926. Bretherton, E. H. S., Sultan Idris Training College, Tanjong Malim, Perak.
- 1897. Brockman, Sir E. L., K.C.M.G., c/o F. M. S. Agency, Cockspur Street, London.
- 1915. Brown, The Hon. Mr. C. C., The Residency, Trengganu. (Vice-President, 1925, 1932).
- 1910. Brown, D. A. M., Glugor, Penang.
- *1913. Bryan, J. M., Borneo Co., Ltd., 28, Fenchurch Street, London.
- 1887. Bryant, A. T., The Moorings, Falmouth, Cornwall, England. (Council, 1907-10; Vice-President, 1912, 1914-16).
- 1932. Bryson, H. P., c/o The Secretariat, Seremban, Negeri Sembilan.
- 1926. Buckle, Miss D. M., o.b.e., Raffles Girls School, Singapore.
- 1932. Burnett, W. I. T., c/o British Wireless Marine Service, Hongkong Bank Chambers, Singapore.
- *1926. Burton, The Hon. Mr. Justice W., Johore Bahru, Johore.
- 1921. Butterfield, H. M., Alor Star, Kedah.
- *1913. Caldecott, Hon. Mr. A., c.m.g., c.b.e., Kuala Lumpur. (Vice-President, 1931, 1932).
- 1932. Calder, J., Johore.
- 1926. Cardon, Rev. Fr. R., Church of St. Francis Xavier, Malacca.
- 1925. Carey, H. R., Segamat, Johore.
- 1924. Carr, C. E., c/o Botanic Gardens, Singapore.
- *1921. Cavendish, A., Kuala Lumpur, Selangor.
- 1921. Chasen, F. N., Raffles Museum, Singapore. (Council, 1925, Hon. Secretary, 1927-).
- *1924. Cheeseman, H. R., Education Dept., Johore Bahru, Johore.
- *1913. Choo Kia Peng, Kuala Lumpur, Selangor.
- 1927. Clark, B. F., c/o Adamson, Gilfillan & Co., Pontianak, W. Borneo.
- *1926. Clarke, G. C., "Tilton," 14, Gallop Road, Singapore.
- 1929. Clarke, W. L., Sibu, Sarawak.
- *1911. Clayton, T. W., c/o The Crown Agents, 4, Millbank, London, England.

1929. Cobden-Ramsay, A. B., District Office, Alor Gajah, Malacca.
1922. Coe, Capt. T. P., c/o The Crown Agents, 4, Millbank, London, England.
1926. Coleman, C. G., Inspector of Schools, Singapore.
- *1920. Collenette, C. L., c/o Department of Entomology, British Museum of Natural History, London (Council, 1922).
1926. Collins, G. E. P., Killaloe, Wroxham, Norfolk, England.
1928. Colomb, R. E., Forest Department, Telok Anson, Perak.
1926. Commandant, The, Police Depot, Kuala Lumpur, Selangor.
1926. Coope, A. E., Federal Secretariat, Kuala Lumpur, Selangor.
1928. Cooper, B., Survey Department, Batu Gajah, Perak.
1926. Cooper, R. H., The Eastern Smelting Co., Ltd., Pusing, F.M.S.
1930. Corbell, H. E., The Eastern Smelting Co., Ltd., Chartered Bank Chambers, Penang.
1929. Corner, E. J. H., Botanical Gardens, Singapore. (Hon. Treasurer, 1932).
1925. Corry, W. C. S.
1921. Coulson, N., Secretary to the Resident, Kuala Lumpur, Selangor.
1921. Cowap, J. C., Government Analyst's Office, Singapore.
- *1923. Cowgill, J. V., Secretariat, Taiping, Perak.
- *1921. Cullen, W. G., Bartolome Mitre 559, Buenos Aires, S. America.
1925. Cullin, E. G., 220, Macalister Road, Penang.
1927. Cumming, C. E., Floral Villa, Ipoh, Perak.
1923. Curtis, R. J. F., Government House, Singapore.
- *1910. Daly, M. D., Cleve Hill, Cork, Irish Free State.
- *1918. David, P. A. F.
1928. Davidson, W. W., c/o The Public Works Department, Johore Bahru, Johore.
1925. Davies, D. J., Sungai Purun Estate, Semenyih, Selangor.
1927. Davies, E. R., 7, Pearl Bank, Singapore.
- *1927. Dawson, C. W.
1931. Dawson, G., Kenneth Estate, Kelantan.
1928. Dawson, W., S. S. Police, Penang.
1923. Day, E. V. G., 19, Ridley Park, Singapore.
1926. Del Tufo, M. V., District Office, Port Dickson, Negri Sembilan.
1922. Denny, A., Sungai Pelek Estate, Sepang, Selangor.
1931. De Souza, H. M., 21, Church Street, Malacca.
1930. De Vos A. E. E., Taiping, Perak.
1929. Dick'nsion, Mrs. W. J., Bandoeng, Java.
1897. Dickson, E. A., 118, Dunkeld Road, Bournemouth, England.
- *1921. Dickson, Rev. P. L., Long Marston Vicarage, Tring, Herts, England.
1926. Director of Forestry, The, Kuala Lumpur, Selangor.

1930. Dohoo, K. G. A., District Office, Jasin, Malacca.
 *1926. Dolman, H. C., Forest Office, Kuala Lumpur, Perak.
 1930. Donlevy, J., c/o S. Way Dredging, S. Way, Selangor.
 *1923. Doscas, A. E. Coleman, Department of Agriculture, Kuala Lumpur, Selangor.
 1922. Drury, Capt. F., Bukit Zahara School, Johore Bahru, Johore.
 1921. Dryburgh, A. M., District Office, Tapah, Perak.
 1926. Duff, Dr. W. R., Taiping, Perak.
 *1915. Dussek, O. T., Sultan Idris Training College, Tanjong Malim, Perak.
 1931. Earl, L. R. F., Colonial Secretariat, Singapore.
 1922. Ebden, The Hon. Mr. W. S., Land Office, Singapore.
 1922. Eckhardt, H. C., c/o Federal Secretariat, Kuala Lumpur, Selangor.
 1922. Edgar, A. T., Suffolk Estate, Sitiawan, Perak.
 1929. Edmett, L. R. J., Linden Estate, Scudai, Johore.
 1927. Education Department, The, Alor Star, Kedah.
 1885. Egerton, Sir Walter, K.C.M.G., Fair Meadow, Mayfield, Sussex, England.
 1921. Elder, Dr. E. A., The British Dispensary, Singapore.
 1922. Elles, B. W., c/o The Crown Agents, 4, Millbank, London, England.
 1918. Elliott, F. M., Treskelly, Marnhull, Sturminster, Newton, Dorset, England.
 1932. English School, The, Muar, Johore.
 1926. Ensor, T. D., c/o Neill & Bell, 1, Old Market Square, Kuala Lumpur, Selangor.
 1913. Ermen, C. E. A., St. Christopher, Combe Down, Bath, Somerset, England.
 *1923. Eu Tong Sen, O.B.E., Sophia Road, Singapore.
 1924. Evans, I. H. N. (Vice-President, 1926-7; 1928-30).
 1925. Fairburn, Hon. Mr. H., F.M.S. Police, Kuala Lumpur, Selangor.
 1927. Farrelly, G. A., Jesselton, British North Borneo.
 1909. Farrer, R. J., C.M.G., Kelantan. (Council, 1925-7).
 *1911. Ferguson-Davie, Rt. Rev. C. J.
 1917. Finlayson, Dr. G. A., "Changi," West Moors, Dorset, England.
 *1919. Finnie, W., 73, Forest Road, Aberdeen, Scotland.
 1925. Fitzgerald, Dr. R. D., c/o The Director of Health and Medical Services, Singapore.
 1926. Flippance, F., Botanic Gardens, Penang.
 *1897. Flower, Major S. S., Spencersgreen, Tring, Herts, England.
 1928. Foenander, E. C., Forest Office, Mentakab, Pahang.
 1923. Forest Botanist, The, Forest Research Institute, Dehra Dun, U. P. India.
 1921. Forrer, H. A., District Court, Penang.
 *1918. Foxworthy, Dr. F. W., 1009, Huntington Buildings, Miami, Florida, U.S.A. (Council, 1923, 1926-7).

- *1921. Fraser, F. W., Thatched House Club, St. James' Street, S.W.1, London, England.
- *1908. Freeman, D., 3, Cleve Road, West Hampstead, London, N.W.6, England.
- 1926. Froda, A. H., Ipoh Club, Ipoh, Perak.
- *1910. Frost, Meadows, Dernford Hall, Swaffling, nr. Saxmundham, Suffolk, England.
- 1931. Gair, E. C., Kerilla Estate, via Temangan, Kelantan.
- *1912. Gallagher, W. J., c/o General Rubber Co., 22, Fenchurch Street, London, E.C.3, England.
- 1931. Gardiner, E. A., Public Works Department, Sungai Patani, Kedah.
- 1932. Gardner, G. B., Bukit Japon, Johore Bahru, Johore.
- *1917. Garnier, Rev. Keppel, Penang.
- 1923. Gater, Prof. B. A. R., College of Medicine, Singapore.
- 1926. Gatfield, W. H., Chinese Protectorate, Singapore.
- 1928. Geake, F. H., c/o Government Analyst, Singapore.
- 1920. Geale, Dr. W. J., Kuala Krai, Kelantan.
- *1926. George, J. R., The Chartered Bank, Singapore.
- *1917. Gerini, Lt.-Col. G. C.
- 1931. Gibson, G. L., Survey Department, Kuala Lumpur, Selangor.
- 1923. Gilmour, A., District Office, Ulu Kelantan, Kuala Krai, Kelantan.
- *1902. Gimlette, Dr. J. D., Hillside, 15, St. Martin's Avenue, Epsom, Surrey, England.
- *1922. Glass, Dr. G. S., Municipal Offices, Penang.
- 1928. Glover, A. H., Municipal Offices, Malacca.
- 1918. Gloyne, G. B., c/o Burt Myrtle & Co., Batavia, Java.
- 1922. Gordon, T. I. M., c/o The Hongkong & Shanghai Banking Corporation, 9, Gracechurch Street, London, E.C.. England.
- 1920. Gordon-Hall, Capt. W. A.
- 1926. Goss, P. H., Survey Department, Malacca.
- 1929. Gracie, A. J., Kuala Trengganu, Trengganu.
- 1927. Graham, H. Gordon, Sungai Kruit Estate, Sungkai, Perak.
- 1929. Gray, G. L., Sandakan, British North Borneo.
- 1923. Green, Dr. P. Withers, c/o Holt & Co., Kirkland House, Whitehall, S.W.1, England.
- 1926. Greene, R. T. B., Institute for Medical Research, Kuala Lumpur, Selangor.
- 1929. Gregg, J. F. F., Colonial Secretariat, Singapore.
- 1931. Gregory, C. P., Sokor Estate, Kelantan.
- 1926. Grice, N., Chinese Protectorate, Sungai Patani, Kedah.
- 1923. Grieve, C. J. K., Post Box No. 58, Klang, Selangor.
- 1911. Grist, D. H., Department of Agriculture, Kuala Lumpur, Selangor.
- 1922. Gubbins, W. H. W., c/o Mansergh & Tayler, Seremban, Negri Sembilan.
- 1926. Gummer, W. A., Survey Department, Kulim, Kedah.

1916. Gupta, Shiva Prasad, Naudansahu Street, Benares City, India.
- *1923. Hacker, Dr. H. P., Zoological Department, University College, London, W.C.1, England.
1923. Haines, Major O. B., S. O. S. Estate, Selama, Perak.
- *1911. Halifax, F. J., Oakwood, Brampton, Cumberland, England.
1915. Hamilton, A. W. (Vice-President, 1922, 1925, 1929-30, 1932).
1924. Hamzah bin Abdullah, Seremban, Negri Sembilan.
1923. Hancock, A. T., 22-2, Tanglin Road, Singapore.
1922. Hanitsch, P. H. V., 99, Woodstock Road, Oxford.
1922. Harrower, Prof. G., College of Medicine, Singapore.
1921. Hart, Henry H., 328, Post Street, San Francisco, U.S.A.
1921. Hashim, Capt. N. M., 12, Tanglin Road, Kuala Lumpur, Selangor.
- *1926. Hastings, W. G. W., 56, Klyne Street, Kuala Lumpur, Selangor.
1921. Hawkins, G., Segamat, Johore.
1925. Hay, A. W., Police Court, Singapore.
1919. Hay, M. C., The Residency, Perlis, Kedah.
1921. Hayes, L. J., Fraser & Co., Singapore.
- *1904. Haynes, The Hon. Mr. A. S., Colonial Secretariat, Singapore. (Council, 1920).
1932. Hayward, M. J., Besut, Trengganu.
1928. Heah Joo Seang, c/o Hin Giap Co., 195, Victoria Street, Penang.
1930. Heath, R. G., Agricultural Office, Parit Buntar, F.M.S.
1922. Hellings, G. S., Supreme Court, Ipoh, Perak.
1926. Helps, A., Federal Secretariat, Kuala Lumpur, Selangor.
1921. Henderson, M. R., Botanical Gardens, Singapore. (Council, 1928; Hon. Treasurer, 1928).
1917. Hereford, G. A., 20, Circular Road, Kuala Lumpur, Selangor.
1926. Heron, F. R., Singapore Cold Storage Co., Singapore.
1929. Herrings, Mrs. J. M., c/o The Manager, Scarboro Estate, Sungai Patani, Kedah.
- *1923. Hicks, E. C., Education Department, Muar, Johore.
1922. Hill, W. C., Singapore Oil Mills Ltd., Havelock Road, Singapore.
1927. His Majesty's Stationery Office, Princes Street, Westminster, S.W.1, London, England.
- *1923. Hodgson, D. H., Forest Department, Kuala Lumpur, Selangor.
1921. Holgate, M. R., Penang Free School, Penang.
1926. Holl, E. S., Kuching, Sarawak.
1923. Holland, A. D., 65, Movies Hill, Olney, Bucks., England.
1922. Holtum, R. E., Botanical Gardens, Singapore. (Hon. Treasurer, 1923-6, 1928; Vice-President, 1923-31; Councillor, 1932).

1921. Hoops, Dr. A. L., C.B.E., Malacca. (Vice-President, 1930, 1932).
1897. Hose, E. S., C.M.G., The Manor House, Normandy, Guildford, England. (Vice-President, 1923, 1925; President, 1924).
1921. Hough, C. C., Raffles College, Singapore.
1923. Howl, Capt. F. W., Federal Secretariat, Kuala Lumpur, Selangor.
1909. Hubback, T. R., Sunlaws, Bukit Betong, Kuala Lipis, Pahang.
1923. Huggins, Capt. J., District Office, Kuantan.
1909. Hughes, The Hon. Mr. J. W. W., The Residency, Seremban, Negri Sembilan.
1932. Hughes, T. H., Chinese Protectorate, Johore Bahru, Johore.
1922. Hunt, Capt. H. North, District Office, Kuala Lipis, Pahang.
1921. Hunter, Dr. P. S., Municipal Officers, Singapore.
- *1926. Ince, H. M., c/o The Secretariat, Sandakan, British North Borneo.
1930. Ince, R. E., King Edward VII School, Taiping, Perak.
1929. Ingle, D. K., Mempakul, via Jesselton, British North Borneo.
1922. Irvine, Capt. R., District Office, Tampin.
1921. Ismail bin Bachok, Dato, Johore Bahru, Johore.
1926. Ismail bin Haji Puteh, District Office, Baling, Kedah.
- *1921. Ivery, F. E., Alor Star, Kedah.
1932. Jackson, G. M. R., c/o Surveyor General, Kuala Lumpur, Selangor.
1925. Jacques, E. V. H., Kuching, Sarawak.
- *1918. James, D., Goebilt, Sarawak.
1927. Jamieson, M., Government Analyst, Singapore.
1931. Jennings, R. S., c/o Messrs. McAuliffe, Davis & Hope, Penang.
- *1921. Jermyn, L. A. S., Batu Pahat, Johore.
1932. Joachim, E. J., Kapoewas Rubber Estate, Soengei Dekan, Pontianak, Borneo.
1910. Johnson, B. G. H., Crossways, Littlehampton, Sussex, England.
1925. Jone, A. E. Thornley, Mansfield & Co., Ltd., Singapore.
- *1918. Jones, E. P., 20, Waterbell Street, Rye, Sussex, England.
- *1913. Jones, The Hon. Mr. S. W., Johore Bahru, Johore.
- *1919. Jordan, A. B., Chinese Protectorate, Singapore.
1932. Joynt, H. R., Land Office, Johore Bahru, Johore.
1921. Kassim, bin Sultan Abdul Hamid Halimsah, Tungku, Alor Star, Kedah.
- *1921. Kay-Mouat, Prof. J. R., College of Medicine, Singapore.
1926. Keith, H. G., Forest Department, Sandakan, British North Borneo.
- *1921. Kellie, J., Dunbar Estate, Neram Tunggal, P.O. Chegar Perah, Pahang.
1913. Kempe, J. E., District Office, Kuala Kangsar, Perak.

- *1922. Ker, W. P. W., c/o Paterson, Simons & Co., Ltd., London House, Crutched Friars, London, E.C.3, England.
- *1920. Kerr, Dr. A., c/o Mrs. Palliser, Street House, Hayes, Kent, England.
- 1931. Khalid bin Tengku Bendahara, Tengku, Kota Bharu, Kelantan.
- 1926. Khoo Sian Ewe, 24, Light Street, Penang.
- 1921. Kidd, G. M., Acting Assistant Adviser, Muar, Johore.
- 1920. King, E. M., Kong Lee (Perak) Plants, Ltd., Bagan Serai, Perak.
- 1927. King, S. E., Chinese Protectorate, Malacca.
- 1926. Kingsbury, Dr. A. N., Medical Institute, Kuala Lumpur, Selangor.
- 1931. Kirk, W. A., Kajang, Selangor.
- 1931. Kirkwood, T. M., c/o Colonial Secretariat, Singapore.
- 1921. Kitching, T., Survey Office, Kuala Lumpur, Selangor.
- 1915. Knight, V., Fairgreen Cottage, Glemsford, Suffolk, England.
- 1931. Knocke, S. M., Royal Air Force Base, Singapore.
- 1914. Lambourne, J., Department of Agriculture, Kuala Lumpur, Selangor.
- 1929. Langlade, Baron Francois de, Budu Estate, Raub, Pahang.
- 1927. Laycock, J., c/o Braddell Brothers, Raffles Place, Singapore.
- 1926. Layman, E. C. H., F.M.S.R. Construction Department, Kuala Lumpur, Selangor.
- *1923. Lease, F. E., The Shanty, Chislehurst Hill, Chislehurst, Kent, England.
- *1921. Lee, L. G., Ladang Geddes, Bahau, Negri Sembilan.
- 1932. Lee Chim Tuan, Mandalay Villa, Tanjong Katong, Singapore.
- 1931. Leechman, G. F., 7, Everton Park, Neil Road, Singapore.
- *1922. Leggate, J., "Troggett's," Wallis Road, Ockley, Surrey, England.
- *1913. Leicester, Dr. W. S., Kuantan, Pahang.
- *1894. Lemon, A. H., c.m.g., Hillbrow, Reigate, Surrey, England. (Vice-President, 1916-18).
- 1920. Lendrick, J., 30, Norre Alle, Aarhus, Denmark.
- 1926. Leonard, Hon. Mr. H. G. R., Kuala Lipis, Pahang.
- *1925. Leonard, R. W. F., Mansfield & Co., Ltd., Penang.
- 1926. Leuthold, W. H., Hooglandt & Co., Singapore.
- 1890. Lewis, J. E. A., Harada 698, Kobe, Japan.
- 1928. Lewis, T. P. M., Maxwell Road, Ipoh, Perak.
- 1922. Leyne, E. G., Sungai Purun Estate, Semenyih, Selangor.
- 1915. Lim Cheng Law, 294, Brick Kiln Road, Penang.
- 1925. Linehan, W., Kota Bharu, Kelantan. (Vice-President, 1931, 1932).
- 1931. Little, W. W., Government English School, Alor Star, Kedah.
- 1928. Loch, C. W., Tronoh Mines, Ltd., Kampar, F.M.S.
- 1918. Loh Kong Imm, 12, Kia Peng Road, Kuala Lumpur, Selangor.

1930. London, G. E., Federal Secretariat, Kuala Lumpur, Selangor.
1932. Longfield, J. E., District Office, Kudat, British North Borneo.
1922. Lowinger, V. A., C.B.E., c/o The Malayan Information Agency, Malaya House, 57, Charing Cross, London, S.W.1, England.
1930. Luckham, H. A. L., District Office, Telok Anson, Perak.
- *1907. Lyons, Rev. E. S., c/o Methodist Publishing House, Manila, Philippine Islands.
- *1920. MacBryan, G. T. M., Bedil House, Kuching, Sarawak.
1926. Macdonald, J., The Chartered Bank, Kuala Lumpur, Selangor.
1929. Mace, N., Survey Department, Kuching, Sarawak.
1932. MacDonnell McMullin, C. A., c/o Martin's Bank Ltd., Wallasey Branch, Cheshire, England.
- *1910. MacFadyen, E., c/o The Sports Club, London, England.
1922. Mackness, L. R., Kuala Lumpur, Selangor.
1921. MacMillan, J. C., S. S. Police, Malacca.
1930. MacNaught, W. E., Game Warden's Office, Taiping, Perak.
1930. Madden, L. J. B., Taiping, Perak.
1929. Mahmud bin Jintan, The Malay College, Kuala Kangsar, Perak.
1924. Mahmud bin Mat, District Office, Grik, Upper Perak.
1903. Makepeace, W., 22, Holmes Grove, Henleaze, Bristol, England. (Council, 1914, 1916, 1920; Hon. Librarian, 1909-12; Vice-President, 1917; Hon. Secretary, 1918-19).
1932. Malacca Historical Society, The, Malacca.
1926. Malay College, The, Kuala Kangsar, Perak.
1927. Malleson, B. K., Sungai Kruit Estate, Sungkai, Perak.
1916. Mann, W. E., Burt Myrtle & Co., Batavia, Java.
1929. Marjoribanks, Dr. E. M., Kuching, Sarawak.
- *1907. Marriner, J. T., Pantiles, Frinton, Essex, England.
1920. Marsh, W., Municipal Offices, Singapore. (Council, 1929, 1931, 1932).
1927. Marshall, A. O., Borneo Motors, Kuala Lumpur, Selangor.
- *1925. Martin, W. M. E.
1921. Maxwell, C. N., Sitiawan, Perak.
1922. May, P. W., Poste Restante, Batavia-Centrum, Java.
1914. Mead, J. P., Forest Office, Kuala Lumpur, Selangor.
1928. Mee, B. S., Forest Department, Kuala Lumpur, Selangor.
1927. Megat Yunus bin Isa, District Office, Krian, Parit Buntar.
1928. Meyer, L. D., Revenue Surveys, Taiping, Perak.
- *1926. Miles, C. V., Rodyk & Davidson, Singapore.
1926. Millar, G. R. M., Tranquerah, Malacca.
1932. Millard, E. B., 10, Buckingham, S.N., Rochester, New York, U.S.A.
1925. Miller, G. S., Mansfield & Co., Ltd., Penang.
- *1921. Miller, J. I., Registrar-General of Statistics, Singapore.

1932. Miller, N. C. E., Department of Agriculture, Kuala Lumpur, Selangor.
1926. Millington, W. M., Colonial Secretariat, Singapore. (Councillor, 1932).
1925. Mills, G. R., Kinta Kellas Estate, Batu Gajah, Perak.
1926. Mills, The Hon. Mr. Justice J. V. Solicitor General's Chambers, Singapore. (Council, 1929-30, 1932).
1924. Mills, L. L., Kuala Lipis, Pahang.
1925. Milne, Charles, Lendu Estate, Alor Gajah, Malacca.
1919. Missionary Research Library, 3041, Broadway, New York City, New York, U.S.A.
1931. Mohamed Ghazaly, Dato Bentara Luar, Kota Bharu, Kelantan.
1924. Mohamed Ibni Sultan Abdul Hamid Halimshah, Tengku, Alor Star, Kedah.
1922. Mohamed Ismail Merican bin Vafoo Merican Noordin, Legal Adviser's Office, Alor Star, Kedah.
1927. Mohamed Noor bin Mohamed, Free School, Penang.
1922. Mohamed Said, Major Dato Haji, Bukit Timbalan, Johore.
1921. Mohamed Salleh, Dato, Johore Bahru, Johore.
1921. Mohamed Sherif bin Osman, Land Office, Alor Star, Kedah.
1920. Monk, H. F., Alor Star, Kedah.
1926. Montgomery, A.
1921. Morgan, S., c/o The Chartered Bank of India, 38, Bishopsgate, London, England.
- *1926. Morice, James.
- *1920. Morkill, A. G., c/o Victoria League, Cromwell Road, London, England.
1920. Moubray, G. A. de C. de, District Office, Batu Gajah, Perak.
1926. Mumford, E. W., Police Department, Ipoh, Perak.
- *1915. Mundell, H. D., Sisson & Delay, Singapore.
1930. Murdoch, Dr. J. W., Mental Hospital, Tanjung Rambutan, Perak.
1913. Murray, Rev. W., Gilstead Road, Singapore.
1909. McArthur, M. S. H., Villa Belfiore, Gardone Riviera, Italy.
1920. McCabe, Dr. J. B., 24, St. Mary's Crescent, Leamington Spa, Warwickshire, England.
1923. McKerron, P. A. B., Federal Secretariat, Kuala Lumpur, Selangor.
1931. McNicol, Mrs. J., Kuala Pertang Estate, Kelantan.
1922. Nash, G. H., Land Office, Kuala Lumpur, Selangor.
1926. Neave, J. R., c/o Colonial Secretariat, Singapore.
1926. Neil, W. H. E., Alor Star, Kedah.
1931. Nesbitt, Miss J., Singapore Chinese Girls School, Singapore.
1932. Newbold, The Hon. Mr. E., c/o The Chartered Bank Chambers, Penang.
1928. Noble, C., Assistant Superintendent of Surveys, Trengganu.
1932. Nollie, Cav. R., 47, Scotts Road, Singapore.
1931. Noone, H. D., Perak Museum, Taiping, Perak.

1916. Ong Boon Tat, 51, Robinson Road, Singapore.
 1923. Opie, R. S., 12, Treacher Road, Kuala Lumpur, Selangor.
 1921. Orchard, H. A. L., Chinese Free School, Cecil Street, Singapore.
 1931. Osman bin Taat, District Office, Krian, Parit Buntar, Perak.
 1920. O'Sullivan, T. A., Education Office, Penang.
 1913. Overbeck, H., Bintaran Kidoel No. 2, Djokjakarta, Java.
 1925. Owen, A. T., c/o Post Office, Seremban, Negri Sembilan.
 1929. Pagden, H. T., Holmtoun, West Byfleet, Surrey, England.
 1919. Park, Mungo, P. O. Delivery 19, Kuala Lumpur, Selangor.
 *1908. Parr, C. W. C., c.m.g., Parrisees Hayne, Howley, nr. Chard, Somerset, England. (Vice-President, 1919).
 1926. Parry, B. B., Cia Mexicana Petroleo "El Aguila" S.A., Puerto Mexico, Mexico.
 1922. Pasqual, J. C., Jitra, Kedah.
 *1921. Paterson, Major H. S., c/o Federal Secretariat, Kuala Lumpur, Selangor.
 1926. Peall, G. T., Singapore.
 1931. Pearson, E. F., Penang Free School, Penang.
 1928. Pease, R. L., Tarsus Estate, Port Dickson, Negri Sembilan.
 1922. Peel, H. E. Sir William, c.m.g., Government House, Hongkong.
 1931. Peet, G. L., c/o The Straits Times, 27, Java Street, Kuala Lumpur, Selangor.
 1928. Penang Free School, Green Lane, Penang.
 1926. Penang Library, Penang.
 *1921. Pendlebury, H. M., F.M.S. Museums, Kuala Lumpur, Selangor.
 *1926. Pengilley, E. E., Land Office, Batu Gajah, Perak.
 1924. Pennefather-Evans, J. P., F.M.S. Police, Kua'a Lumpur, Selangor.
 *1925. Penrice, W., Mansfield & Co., Ltd., Singapore.
 1914. Pepys, The Hon. Mr. W. E., Goverment Monopolies, Singapore.
 *1920. Peskett, A. D., Eastern Telegraph Co., Electra House, Moorgate, London, E.C.2, England.
 1920. Peters, E. V., c/o Yukon Gold, Ampang, Selangor.
 1932. Phillipps, A. E., Sandakan, British North Borneo.
 1931. Phillips, R., Sokor Estate, Temangan, Kelantan.
 1925. Pijper, Dr. G. F., Batavia-Centrum, Java.
 *1921. Plummer, W. P.
 1928. Powell, I. B., Llanfihangel, Talyllyn, Breconshire, Wales.
 1932. Pretty, E., Secretary to the High Commissioner, Singapore.
 1926. Purdom, Miss N., Education Office, Ipoh, Perak.
 1926. Quah Beng Kee, 15, China Street, Penang.
 1926. Rae, Cecil, Ipoh, Perak.
 1924. Raja Muda of Perak, Telok Anson, Perak.
 1932. Raja Ratnam, A., Infant Welfare Centre, Ipoh, Perak.

1929. Raja Razman bin Raja Abdul Hamid, Kuala Kangsar, Perak.
 1924. Rambaut, A. E., Forest Department, Kuala Lumpur, Selangor.
 1932. Rawlings, G. S., Jasin, Malacca.
 1916. Rayman, L., Johore Bahru, Johore.
 *1926. Reay, J. McCabe, 29, Crystal Palace, Park Road, Sydenham, S.E.26, England.
 1924. Reed, J. G., Klang, Selangor.
 1931. Rego, Rev. A. S., Portuguese Mission, Victoria Street, Singapore.
 *1910. Reid, Dr. Alfred, Batang Padang Estate, Tapah, F.M.S.
 1926. Rennie, A. A., Kuching, Sarawak.
 1930. Rentse, A., Kuala Hau Estate, Kelantan.
 *1921. Rex, The Hon. Mr. Marcus, Kuala Lumpur, Selangor.
 1915. Richards, H. E. Mr. A. F., c.b.e., Government House, Jesselton, British North Borneo. (Council, 1923, 1926-7, 1929).
 1931. Richardson, R. J., Kenneth Estate, Kelantan.
 1923. Ridout, F. G., c/o The Harbour Board, Singapore.
 *1926. Rigby, W. E., c/o The Chartered Bank, Singapore.
 1912. Robertson, J., c/o Messrs. Wright, Johnston & Orr, 174, West George Street, Glasgow.
 1926. Robinson, P. M., c/o The Eastern Smelting Co., Ltd., Penang.
 1916. Rogers, A., Public Works Department, Penang.
 *1917. Rowland, W. R., Schloss Kalling, Post Moosen a.d. Bils, Oberbayern, Germany.
 1931. Ruiter, L. Coomans de, Singkawang, West Borneo.
 1922. Russell, D. J. A., Kuala Lumpur, Selangor.
 1931. Samuel, P., Government English School, Alor Star, Kedah.
 1926. Sanger-Davies, A. E., Forest Department, Taiping, Perak.
 *1928. Sansom, The Hon. Mr. C. H., Police Headquarters, Kuala Lumpur, Selangor.
 *1919. Santry, D., Swan & Maclaren, Singapore.
 *1896. Saunders, C. J., The Lawn, Barcombe Mills, nr. Lewes, Sussex, England. (Vice-President, 1910-11, 1914-15; President, 1916-18).
 1923. Savage, H. E., Geological Survey Department, Batu Gajah, Perak.
 1926. Sayid Jan bin Sayid Asgar Ali, Government English School, Sungai Patani, Kedah.
 1922. Sayid Mohamed Idid bin Ali Idid, Alor Star, Kedah.
 1926. Sayid Shaidali, Government English School, Batu Gajah, Perak.
 1929. Scott, Sir John, k.b.e., c.m.g., The Colonial Secretariat, Singapore.
 *1920. Scott, Dr. Waugh, Sungai Siput, Perak.
 1906. Scrivenor, J. B., I.S.O., 68, Chaucer Road, Bedford, England. (Vice-President, 1922, 1924, 1926-30).

- *1915. See Tiong Wah, Balmoral Road, Singapore.
- 1922. Sehested, S., Eastern Smelting Building, Kuala Lumpur, Selangor.
- *1927. Sells, H. C., Satuan, Burnham, Buckinghamshire, England.
- 1926. Sheffield, J. N., Topographical Surveys Department, Taiping, Perak.
- 1923. Sheikh Abdullah bin Yahya, Capt., Bukit Timbalan, Johore.
- 1925. Shelley, The Hon. Mr. M. B., Federal Secretariat, Kuala Lumpur, Selangor. (Council, 1930-31; Vice-President, 1932).
- 1929. Sheppard, M. C. Franck, Carcosa, Kuala Lumpur, Selangor.
- 1924. Sime, F. D., Bukit Lintang Estate, Malacca.
- 1926. Simmons, J. W., c/o The Crown Agents, 4, Millbank, London, England.
- 1921. Simpson, P., Presgrave & Mathews, Penang.
- 1927. Simpson-Gray, L. C., Deputy Public Prosecutor, Kuala Lumpur, Selangor.
- *1909. Sims, W. A., The Lodge, Gander Green Lane, Cheam, Surrey, England.
- 1931. Singam, T. R., Government English School, Pekan, Pahang.
- 1920. Skinner, C. F., Beaufort, Jesselton, British North Borneo.
- 1921. Skrine, W. F. de V., c/o The Chartered Bank, Singapore.
- *1926. Sleep, A., Federal Secretariat, Kuala Lumpur, Selangor.
- 1922. Small, The Hon. Mr. A. S., The Treasury, Singapore.
- 1922. Smart, Dr. A. G. H., State Medical and Health Officer, Selangor.
- 1924. Smedley, N., c/o E. R. Emms, Esq., Syleham House, nr. Diss, Norfolk, England. (Hon. Treasurer, 1926-7; Asst. Hon. Secretary, 1928-9).
- 1929. Smith, C. R., Keningau, via Jesselton, British North Borneo.
- 1912. Smith, Prof. Harrison W., Papeari, Tahiti, Society Islands.
- 1924. Smith, J. D. Maxwell, Parit Buntar, Perak.
- 1931. Smith, J. S., Forest Office, Batu Gajah, Perak.
- 1930. Soang, A. I. C., Batoe Doelang Estate, Semarangkai, Pontianak, Borneo.
- 1928. Sollis, C. G., Inspector of Schools, Kuala Lumpur, Selangor.
- 1932. Somerville, D. A., District Office, Kuala Selangor, Selangor.
- 1910. Song Ong Siang, Aitken & Ong Siang, Singapore.
- 1921. South, F. W., Department of Agriculture, Kuala Lumpur, Selangor.
- 1925. Sproule, The Hon. Mr. Justice P. J., Supreme Court, Singapore.
- 1927. Staines, E. A., Controller, Posts and Telegraphs, Penang.
- 1928. Stanton, W. A., Brooklands Estate, Banting, Selangor.
- 1925. Stark, W. J. K., Labour Office, Kuala Lumpur, Selangor.
- 1920. Stevens, The Hon. Mr. Justice F. G., Supreme Court, Singapore. (Council, 1914-15, 1931).
- *1917. Stirling, W. G., c/o Midland Bank, Melton Mowbray, England. (Council, 1923-5, 1927-31).

1928. Stookey, Dr. V. A., Sandakan, British North Borneo.
 1921. Stowell, E. La M., Green Glades, Alverstone, Isle of Wight, England.
 1930. Strahan, A. C., Victoria Institution, Kuala Lumpur, Selangor.
 1926. Strauts, E. A., Forest Department, Kuala Lumpur, Selangor.
 1927. Strugnell, E. J., Forest Office, Kuala Lumpur, Selangor.
 1926. Sultan Idris Training College, Tanjung Malim, Perak.
 1927. Sungai Patani Government English School, Sungai Patani, Kedah.
 1912. Swayne, J. C., Junior Constitutional Club, Piccadilly, London, W. 1, England.
 1923. Sworder, G. H., Survey Office, Taiping, Perak.
 *1918. Sykes, G. R., Chinese Protectorate, Alor Star, Kedah.
 1930. Symington, C. F., Forest Research Institute, Kepong, Selangor.
 1908. Tan Cheng Lock, The Hon. Mr., 59, Heeren Street, Malacca.
 *1926. Tan Soo Bin, 9, Boat Quay, Singapore.
 1913. Taylor, C. J., Telok Manggis Estate, Sepang, Selangor.
 *1928. Taylor, E. N., Bankruptcy Department, Singapore. (Councillor, 1932).
 1925. Taylor, W. R., MacLaine Watson & Co., Batavia, Java.
 1921. Terrell, Mr. Justice A. K. A. B., Supreme Court, Singapore.
 1929. Terry, R. A., Survey Department, Singapore.
 1927. Thillaimuthu, S., Kennedy Burkhill & Co., Ltd., Ipoh, Perak.
 *1921. Thomas, L. A., Chief Police Office, Singapore.
 1926. Thomas, T. J., 17, Fort Terrace, Malacca.
 1923. Thorne, The Hon. Mr. Justice W. H., Supreme Court, Kuala Lumpur, Selangor.
 1932. Thurston, F. B., c/o Adviser on Irrigation to the Malay States, Kuala Lumpur, Selangor.
 1930. Tivy, L. W., Katoyang Estate, Tanjung Malim, Perak.
 1926. Toyo Bunko, 26, Kami Fujimayecho, Hongo, Tokyo, Japan.
 1930. Treeby, J. W. C., Tanjung Rambutan, Perak.
 1932. Trumble, D. H., F.M.S. Customs Office, Ipoh, Perak.
 1930. Turner, H. G., District Office, Ipoh, Perak.
 1932. Tweedie, M. W. F., Raffles Museum, Singapore.
 1923. Undang of Rembau, The, Dato Sedia Raja Abdullah, Rembau, Negri Sembilan.
 1930. University Library, The, University of Rangoon, Rangoon, Burma.
 1925. Venables, O. E., Land Office, Kuala Lumpur.
 *1926. Waddell, Miss M. C.
 1931. Walker, F. S., District Forest Office, Malacca.
 1926. Walker, H. Hopson, Klang, Selangor.
 *1926. Wallace, W. A., Tewantin, via Cooroy, Queensland, Australia.
 1921. Walton, B. S., Land Office, Malacca.
 1923. Wan Idris bin Ibrahim, Muar, Johore.

1932. Watherston, D. C., District Office, Kuala Kangsar, Perak.
 1917. Watson, J., Education Office, Singapore.
 1916. Watson, J. G., Forest Research Institute, Kepong, Selangor.
 1916. Watson, Sir Malcolm, Ross Institute, Putney Heath, London, England.
 1931. Wee Kwee Theow, Tumpat, Kelantan.
 1931. Wendover, R., Philippine Cutch Corporation, Zamboanga, Philippine Islands.
 1926. Wheatley, M., c/o The Inspector of Schools, Kuala Lumpur, Selangor.
 1927. White, The Ven. Graham, 1, Mt. Sophia Road, Singapore
 1931. White, W. A., Kota Lama, Brastagi, Sumatra.
 1923. Whitfield, L. D., Segamat, Johore.
 1929. Whyte, Robert Paisley, Posts and Telegraphs, Kuala Lumpur, Selangor.
 *1926. Wilcoxon, W. J., c/o The Straits Trading Co., Ltd., Singapore.
 *1920. Wilkinson, R. J., c.m.g., Poste Restante, Mitylene, Greece.
 *1926. Willan, T. L., Police Court, Malacca.
 1921. Willbourn, E. S., Batu Gajah, Perak.
 *1922. Williams, F. L., Chinese Protectorate, Singapore.
 *1910. Winkelmann, H.
 1904. Winstedt, The Hon. Dr. R. O., c.m.g., d.litt., Johore Bahru, Johore. (Vice-President, 1914-15, 1920-1, 1923-5, 1928; President, 1927, 1929, 1931-2).
 1932. Wong, S. Q., 6, Raffles Place, Singapore.
 1913. Wood, W. L., Istana Gardens, Johore Bahru, Johore.
 1920. Woolley, G. C., c/o Meade King & Co., 22-24, Orchard Street, Bristol, England.
 1927. Woolley, J. B., "Harbledown," Cambridge Road, Great Shelford, Cambridge, England.
 *1905. Worthington, A. F.
 1921. Wurtzburg, C. E., Mansfield & Co., Ltd., Singapore. (Council, 1924-6, 1930; Hon. Secretary, 1925; Vice-President, 1927, 1929, 1931-2).
 1914. Wyly, A. J., Lebong Donok, Moeara Aman, Sumatra.
 1926. Yahya bin Ahmad Afifi, 70, The Arcade, Singapore.
 *1923. Yates, H. S., Rt. 5 Box 114, Santa Rosa, California, U.S.A.
 *1917. Yates, Major W. G.
 1932. Yeh Hua Fen, c/o Pay Fong School, Malacca.
 *1920. Yewdall, Capt. J. C., c/o Lloyds Bank, 6, Pall Mall, London, W.1., England.
 *1904. Young, H. S., Rosemount, Tain, Rossshire, England.
 1920. Zainal Abidin bin Ahmad, Sultan Idris Training College, Tanjong Malim, Perak.

RULES
of
The Malayan Branch
of the
Royal Asiatic Society

I. Name and Objects.

1. The name of the Society shall be "The Malayan Branch of the Royal Asiatic Society."
2. The objects of the Society shall be:—
 - (a) The increase and diffusion of knowledge concerning British Malaya and the neighbouring countries.
 - (b) The publication of a Journal and of works and maps.
 - (c) The acquisition of books, maps and manuscripts.

II. Membership.

3. Members shall be of three kinds—Ordinary, Corresponding and Honorary.
4. Candidates for ordinary membership shall be proposed and seconded by members and elected by a majority of the Council.
5. Ordinary members shall pay an annual subscription of \$6 payable in advance on the first of January in each year.

No member shall receive a copy of the Journal or other publications of the Society until his subscription for the current year has been paid.

Newly elected members shall be allowed to compound for life-membership for \$100; other members may compound by paying \$50, or \$100 less the amount already paid by them as ordinary members in annual subscriptions, whichever of these two sums is the greater. Societies and Institutions are eligible for ordinary membership.

6. On or about the 30th of June in each year the Honorary Treasurer shall prepare and submit to the Council a list of those members whose subscriptions for the current year remain unpaid. Such members shall be deemed to be suspended from membership until their subscriptions have been paid, and in default of payment within two years shall be deemed to have resigned their membership*

* Bye-Law, 1922. "Under Rule 6 Members who have failed to pay their subscription by the 30th June are suspended from membership until their subscriptions are paid. The issue of Journals published during that period of suspension cannot be guaranteed to members who have been so suspended."

7. Distinguished persons, and persons who have rendered notable service to the Society may on the recommendation of the Council be elected Honorary Members by a majority at a General Meeting. Corresponding Members may, on the recommendation of two members of the Council, be elected by a majority of the Council, in recognition of services rendered to any scientific institution in British Malaya. They shall pay no subscription; they shall enjoy the privileges of members (except a vote at meetings and eligibility for office) and free receipt of the Society's publications.

III. Officers.

8. The officers of the Society shall be:—
A President.

Vice-Presidents not exceeding six, ordinarily two each from (i) the Straits Settlements, (ii) the Federated Malay States and (iii) the Unfederated or other Protected States, although this allocation shall in no way be binding on the electors.

An Honorary Treasurer. An Honorary Secretary.
Five Councillors. An Assistant Honorary Secretary.

These officers shall be elected for one year at the Annual General Meeting, and shall hold office until their successors are appointed.

9. Vacancies in the above offices occurring during any year shall be filled by a vote of the majority of the remaining officers.

IV. Council.

10. The Council of the Society shall be composed of the officers for the current year, and its duties and powers shall be:—

- (a) to administer the affairs, property and trusts of the Society.
- (b) to elect Ordinary and Corresponding Members and to recommend candidates for election as Honorary Members of the Society.
- (c) to obtain and select material for publication in the Journal and to supervise the printing and distribution of the Journal.
- (d) to authorise the publication of works and maps at the expense of the Society otherwise than in the Journal.
- (e) to select and purchase books, maps and manuscripts for the Library.
- (f) to accept or decline donations on behalf of the Society.
- (g) to present to the Annual General Meeting at the expiration of their term of office a report of the proceedings and condition of the Society.

- (h) to make and enforce by-laws and regulations for the proper conduct of the affairs of the Society. Every such bye-law or regulation shall be published in the Journal.
11. The Council shall meet for the transaction of business once a quarter and oftener if necessary. Three officers shall form a quorum of the Council.

V. General Meetings.

12. One week's notice of all meetings shall be given and of the subjects to be discussed or dealt with.

13. At all meetings the Chairman shall in the case of an equality of votes be entitled to a casting vote in addition to his own.

14. The Annual General Meetings shall be held in February in each year. Eleven members shall form a quorum.

15. (i) At the Annual General Meeting the Council shall present a report for the preceding year and the Treasurer shall render an account of the financial condition of the Society. Copies of such report and account shall be circulated to members with the notice calling the meeting.

(ii) Officers for the current year shall also be chosen.

16. The Council may summon a General Meeting at any time, and shall so summon one upon receipt by the Secretary of a written requisition signed by five ordinary members desiring to submit any specified resolution to such meeting. Seven members shall form a quorum at any such meeting.

17. Visitors may be admitted to any meeting at the discretion of the Chairman but shall not be allowed to address the meeting except by invitation of the Chairman.

VI. Publications.

18. The Journal shall be published at least twice in each year, and oftener if material is available. It shall contain material approved by the Council. In the first number of each volume shall be published the Report of the Council, the account of the financial position of the Society, a list of members and the Rules.

19. Every member shall be entitled to one copy of the Journal, which shall be sent free by post. Copies may be presented by the Council to other Societies or to distinguished individuals, and the remaining copies shall be sold at such prices as the Council shall from time to time direct.

20. Twenty-five copies of each paper published in the Journal shall be placed at the disposal of the author.

VII. Amendments of Rules.

21. Amendments to these Rules must be proposed in writing to the Council, who shall submit them to a General Meeting duly

summoned to consider them. If passed at such General Meeting they shall come into force upon confirmation at a subsequent General Meeting or at an Annual General Meeting.

Affiliation Privileges of Members.

Royal Asiatic Society. The Royal Asiatic Society has its headquarters at 74, Grosvenor Street, London, W., where it has a large library and collection of MSS. relating to oriental subjects, and holds monthly meetings from November to June (inclusive) at which papers on such subjects are read.

2. By Rule 105 of this Society all the Members of Branch Societies are entitled when on furlough or otherwise temporarily resident within Great Britain and Ireland, to the use of the Library as Non-Resident Members and to attend the ordinary monthly meetings of the Society. This Society accordingly invites Members of Branch Societies temporarily resident in Great Britain or Ireland to avail themselves of these facilities and to make their home addresses known to the Society so that notice of the meetings may be sent to them.

3. Under Rule 84, the Council of the Society is able to accept contributions to its Journal from Members of Branch Societies, and other persons interested in Oriental Research, of original articles, short notes, etc., on matters connected with the languages, archaeology, history, beliefs and customs of any part of Asia.

4. By virtue of the aforementioned Rule 105 all Members of Branch Societies are entitled to apply for election to the Society without the formality of nomination. They should apply in writing to the Secretary, stating their names and addresses, and mentioning the Branch Society to which they belong. Election is by the Society upon the recommendation of the Council.

5. The subscription for Non-Resident Members of the Society is 30/- per annum. They receive the quarterly journal post free.

Asiatic Society of Bengal. Members of the Malayan Branch of the Royal Asiatic Society, by a letter received in 1903, are accorded the privilege of admission to the monthly meetings of the Asiatic Society of Bengal, which are held usually at the Society's house, 1, Park Street, Calcutta.

A Revision of the Malayan Species of *Ficus*: *Covellia* and *Neomorphe*.

By E. J. H. CORNER.

Botanic Gardens, Singapore

In a tropical flora the wild figs form a most striking element. Everywhere they abound as shrubs, trees and climbers, along roadsides, in waste-places, as weeds in gardens, and in the forest, where most occur; and not a few are planted for ornament. They are interesting botanically not merely on account of the vast number of species and the great variety of their 'fruits,' but because they are such successful plants with a most peculiar and highly specialised inflorescence and pollination-mechanism—one of the strangest that is known, with which has been bound up the evolution of several genera of pollinating wasps, which lay their eggs in certain of the flowers, and of their own hymenopterous parasites—and because, like so many other large genera of tropical plants, they display all the main growth-forms excepting the herbaceous. How have they evolved their special equipment, and how is it that a shrub becomes a tree or a tree a shrub, or either a climber? And some are epiphytes with a monstrous kind of radical trunk by means of which they tap the soil fifty or a hundred feet below and strangle and supplant their original support: and yet others bear their figs underground. Bionomically, too, the gall-figs present a wonderful and most active little world of their own; as they ripen and fall, the wasps and their parasites scramble out and straightaway fly off in search of other figs. But before one can pass satisfactorily to these most interesting problems of biology and evolution, the specific data must be accurately assembled.

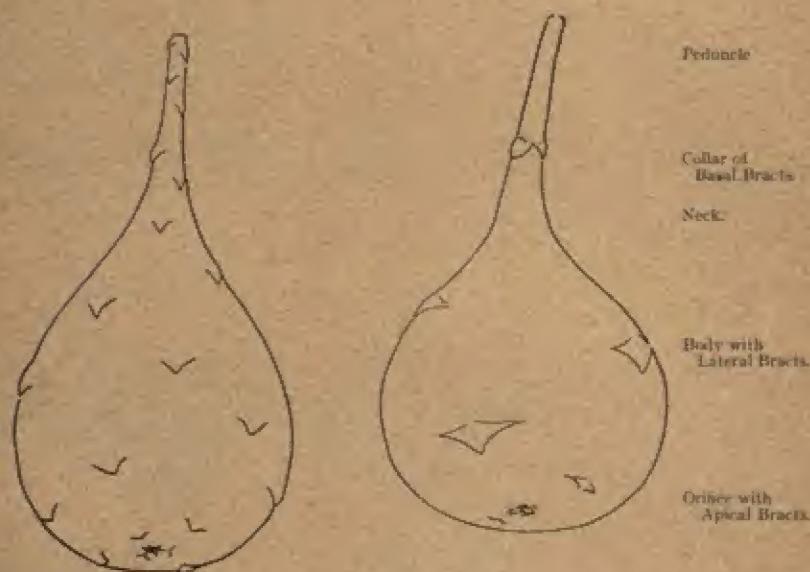
The genus is well represented in Malaya by about 80 species in seven subgenera, out of a world-total of some 900 living species in ten or eleven subgenera. My intention was to find an easy way of identifying our species from the more obvious external characters, which should be possible, and without recourse, as at present, to minute floral details. But there has been no little confusion over several species, even the common ones, and a critical revision is needed before any such progress can be made. I learnt also, in checking the identifications from King's monograph, how deficient is our knowledge of the floral structure, partly through lack of material and partly through incorrect observation: yet, on the floral structure depends very largely the scientific analysis of the genus, and after King's there has been no other detailed investigation of the subject. I find also that there are certain features

of the receptacle (the botanical term for the 'fruit' or 'fig') which have been overlooked, or treated empirically, and which, on consideration, are useful diagnostically, if not in understanding the evolution of the receptacle. Despite all the specific description our knowledge of the genus is far from perfect; the defects can be made good more readily by those who can examine the living plants and obtain plentiful material for study. I have accordingly begun with two small subgenera, most species of which, being common, I have examined in the field.

King's monograph, published in 1887, is the standard work on asiatic figs (5). Many new species have been described since, especially from the Philippines, Borneo and New Guinea (8, 14), with minor contributions in local floras, but there has been no more fundamental extension of our knowledge of the group. Ridley followed King in dealing with the malayan species (12). In Koorders' works there are many valuable observations on the habits of javanese species, most of which occur in Malaya, while Elmer's field-notes give a vivid idea of the richness of the Philippines in remarkable forms (8). A great deal of revision is needed however before all these species can be related scientifically and even more is this the case when one considers the genus as a whole and its representatives in other continents. Hutchinson has revised the tropical african species (4), and Standley those from tropical America (13). It seems that each continent has its characteristic subgenera—though *Sycomorus* of Africa is clearly *Neomorphe* of the East, if *Sycidium* of Africa is not *Sycidium* of the East (4). The indo-malayan region, according to Mildbraed and Burret (9), is the home of the genus; they consider that the less specialised sections are here the better represented, and hence it has spread to Africa, Australia and America. But there is little evidence to decide which sections are primitive; King would place *Neomorphe* as the most advanced asiatic subgenus, yet, as I will show, it is more likely to be primitive, and one may seriously question the validity of certain subgenera. The unistaminate flower is surely the limit of reduction, not the primitive element, in the male inflorescence; and the african *Sycidia* appear to have the most primitive receptacles.

As defined by King, the subgenera *Covellia* and *Neomorphe* have two kinds of receptacle, the one with female flowers, the other with gall-flowers (the sterile female flowers in which the pollinating wasps lay their eggs) and male flowers, these being disposed in a circle round the orifice, and in both subgenera the receptacles are typically cauliflorous, i.e. borne on the branches below the leaves or on the trunk. They differ in habit and the number of stamens. The species of *Neomorphe* are mostly large trees with two stamens in each male flower; those of *Covellia* are shrubs or small trees with one stamen. The value of the staminal criterion is doubtful and one should, perhaps, substitute the structure of the perianth.

Of the fourteen species to be described, six are recorded from Malaya for the first time, one being new, and in five species, apart from this, the description of the flowers has been more or less incomplete. Two species may be endemic, namely *F. Scortechinii* and *F. viridicarpa*. I have examined all but *F. cunia* and *F. pomifera* in the field, and I have gone through the malayan specimens in the Singapore herbarium; under each species the sheets available have been quoted. I have not attempted to examine the



Text-Fig. 1. Left:—a receptacle of the african subgenus *Sycidium* (after Hutchinson, 1915). Right:—a complete receptacle.

related species from neighbouring countries for it is obvious that better contributions can be made by those with a first-hand knowledge of the plants, but, by discussing the morphological points of comparison preparatory to the descriptions, I think it has been possible to show the relationships between the malayan species. I have limited the research to the low-powers of a binocular microscope, but the minute structure of the leaf and hairs is important

and characteristic. The measurements of the flowers have been taken from fully developed receptacles. In the citation of collections, 'S.' stands for Singapore Field Number.

Covellia.

The Receptacle. The fig-receptacle is a modified bud. Instead of opening by internodal extension it is converted into a flask with narrow mouth by the expansion and relative displacement of the middle section which arches beyond the morphological apex. The leaves are reduced to scale-like bracts and are borne spirally although, on account of the localisation of internodal extension, they are generally disposed in a characteristic manner, as shown in Text-Fig. 1. Typically in Covellia the first internode extends projecting the bud and giving the *peduncle*. The next two internodes do not extend and the three basal bracts form a false whorl—the *collar*—at the apex of the peduncle. The succeeding internodes expand radially in the manner of an ordinary growth-curve which rises gradually to a maximum and then falls abruptly, and the peripheral tissue of the lower internodes also elongates in a gradated manner. The *body* of the receptacle thus bears scattered *lateral bracts* which are crowded distally, and the *apical bracts*, which close the orifice, are closely set, imbricating and interlocking. Bracteoles occur between the male flowers which occupy the morphological base of the inflorescence and not between the gall-flowers and female flowers which cover the expanded apex. Such a receptacle is specialised because its growth is differentiated into two distinct pulses, the first being a simple internodal elongation and the second, after an interval of two internodes, being a complicated elongation and expansion covering many internodes: and according as the elongation or expansion initially preponderates, so the body has a longer or shorter *neck* distal to the collar. The simplest receptacle is constructed on a single growth-pulse, as in the African Sycidia described by Hutchinson (4), Text-Fig. 1: the growth-pulse is continuous, passing from an initial elongation through several internodes to a gradually increasing expansion and peripherally displaced, decreasing elongation with a final abrupt fall, as in Covellia: the bracts are scattered along the peduncle and over the body without forming a collar. It is then not so great a step to the simplest diphasic receptacle by dissociating elongation and expansion by two internodes and restricting elongation to the first internode, as in *F. hispida* and *F. cunia*. The next advance leads

to the condition in *F. lepicarpa*; the lateral bracts tend to be condensed in a whorl situated about two-thirds along the body from the collar; the whorl, which consists of 3—5 bracts, may be indistinct, some of the members being advanced towards the orifice, but the disposition points to the final step in Covellia in which the second growth-pulse falls entirely within the internode subsequent to the collar. This gives the most elaborate receptacle with peduncle, tri-bracteate collar and ebracteate body, as in *F. fistulosa*: growth occurs principally in two pulses, each limited to one internode, and it is the general mode of formation of the fig-receptacle. Another variation occurs in *F. Beccarii*, *F. geocarpa* and *F. lepicarpa* in which the peduncle is very short or absent. It seems a retrograde step rendering the fig more bud-like as the shooting-mechanism progressively fails: in the primitive receptacle all the lower internodes elongate; in the diphasic receptacle elongation is suppressed in the second and third internodes; and in the sessile or subsessile receptacle it is more or less suppressed also in the first internode. But the receptacles of *F. Beccarii* and *F. geocarpa* are unspecialised in retaining many lateral bracts: they appear to be on a separate line of evolution from the other malayan species. It not infrequently happens that the localisation of internodal extension is imperfect in the species without lateral bracts, and one or two of the basal or apical bracts may be displaced on to the body, but such variations are exceptional. There is a close analogy between the receptacle of *Ficus* and the 'flower-head' of a Composite, the wall and bracts of the one corresponding with the disc and involucre of the other.

The relations between the species in these respects are shown in the following table:—

Receptacles distinctly pedunculate

Receptacles typically with lateral bracts

F. cunia, *F. hispida*

Receptacles typically without lateral bracts.

F. chamaecarpa, *F. fistulosa*, *F. Miquelianii*,

F. obpyramidata, *F. Scortechnikii*

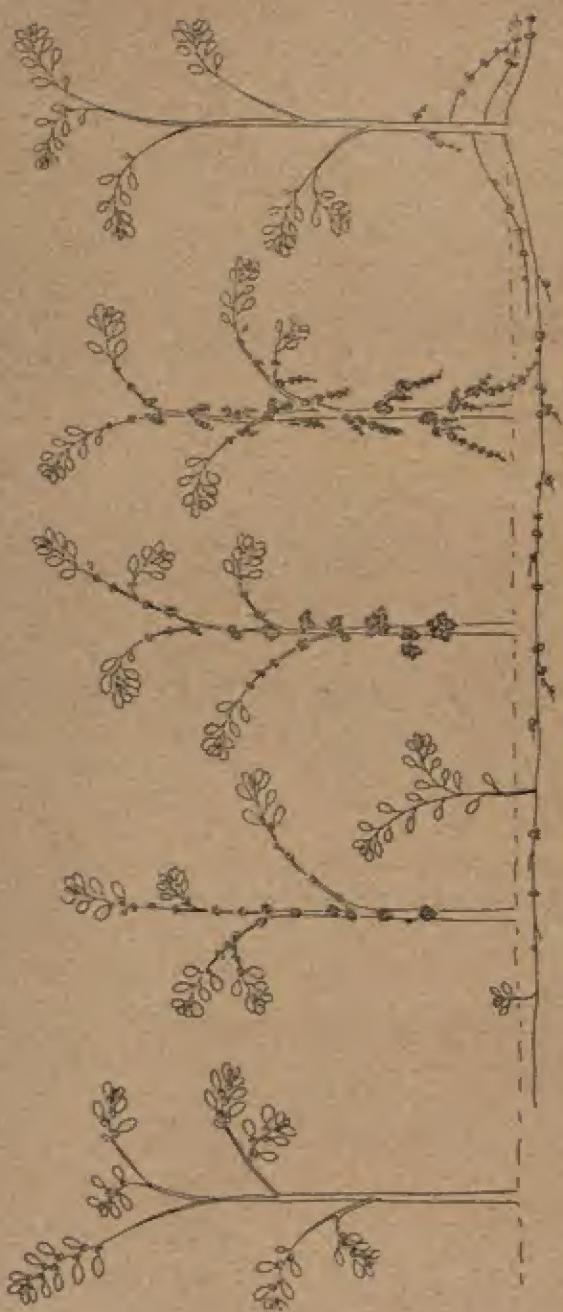
Receptacles sessile or subsessile

With 3 basal bracts in a collar and a ring of lateral bracts
towards the orifice

F. lepicarpa

With several (3—7) basal bracts and the lateral bracts
scattered over the body.

F. Beccarii, *F. geocarpa*



Text-Fig. 2. A diagram of the evolution of the gynoecarpous habit. From left to right:—with axillary receptacles, as in *F. pterocarpa*; with caudine receptacles on tubercles, as in *F. Scorzonerifolia*; with caudine receptacles on short, leafless twigs, as in *F. Miqailii*; with caudine receptacles on long hanging twigs, as in *F. bipinnis*; with the receptacles on subterranean runners, as in *F. gynoecarpa*.

The Position of the Receptacles. In *F. lepicarpa* the receptacles are borne in pairs in the axils of the leaves. This must be the primitive position and suggests an original paniced inflorescence. The other species are generally cauliflorous or with the receptacles on long, leaf-less branches from the trunk. In *F. fistulosa* and *F. Scortechnii* a few receptacles may occur on the leafy shoots as in *F. lepicarpa* but most are on the older branches or the trunk in compact clusters. The axillary buds develop after the leaf-fall and at first produce the receptacles in pairs, or small clusters of 4–6, but as they grow they branch and form short woody leafless stems, a few inches long, devoid of stipules, and with very little internodal elongation; only occasionally they shoot into a leafy twig. These short branches bear the receptacles singly or in small groups in the axils of their suppressed leaves and their rudimentary buds may grow out in like manner; thus there are developed on the old trunk and branches groups of woody twigs and tubercles from which the successive crops of receptacles sprout to form dense masses. In *F. Scortechnii* these masses are very conspicuous and cushion-like, up to 10 cm. wide.

In *F. obpyramidata* and *F. Miquelii* all the receptacles are cauliflorous and the fruiting branches reach a much greater length, up to 35 cm. in *F. Miquelii*, the clusters of receptacles looking like bunches of enormous grapes.

In *F. hispida* the receptacles are mostly cauliflorous as in *F. Miquelii*, occasionally on the leafy twigs, but very characteristically some of the fruiting branches elongate up to three feet or so and, dangling, bear the receptacles along their whole length; according to Koorders they may even reach the ground and, burrowing, bear subterranean figs for a short distance. And this leads to the geocarpic habit in the other species.

In *F. Beccarii*, *F. geocarpa*, *F. cunia* and *F. chamaecarpa*, the fruiting branches arise only from the lower part of the main stem, for a height of three feet from the ground, and grow into sparingly branched, whip-like strands, up to 20 ft. long and an inch or so thick at the base. They are leafless but pairs of caducous stipules, subtending the suppressed leaves, cover the growing-point. They sag as they elongate and then grow along the ground. They are soon covered with falling leaves but they tend also to burrow into the loose humus, and, where they meet an obstruction as a bank or mound of earth, they push into the soil just like a root; the internodes shorten and numerous adventitious rootlets arise, holding the stem firmly while the apex worms its way along. The receptacles are borne singly or in pairs in the axils of the suppressed leaves, scattered along the strands, rarely in small clusters, and, except in *F. cunia*, nearly all are subterranean. In *F. cunia* they occur abundantly on the short subaerial parts of the fruiting branches as well as underground, but in the other three they are subaerial only on the young branches as they project a few inches from the trunk.

Where the fruiting branches burrow deeply, they root strongly and then often send up aerial shoots which in their turn produce fruiting branches; and, in time, the old connecting strands die away and the new plants are separated organically from their parents. The fruiting branches thus act as stolons in vegetative propagation. So one often meets with close stands of these species in full growth and without a sign of the receptacles, until on pulling gently on the runners they come to the surface.

The evolution of these different ways of fruiting, as it may have occurred, is shown pictorially in Text-Fig. 2, and the relation between the species in this respect can be tabulated as follows:—

Receptacles axillary on the leafy twigs

F. lepicarpa

Receptacles mostly caulilorous

Fruiting branches short, up to 8 cm. long, generally much less; receptacles in dense pulvinate clusters.

F. fistulosa, *F. Scortechnii*

Fruiting branches generally much longer

Fruiting branches up to 34 cm. long; receptacles in botryoidal masses.

F. obpyramidata, *F. Miquelianii*

Fruiting branches up to 100 cm. long, receptacles in false racemes.

F. hispida

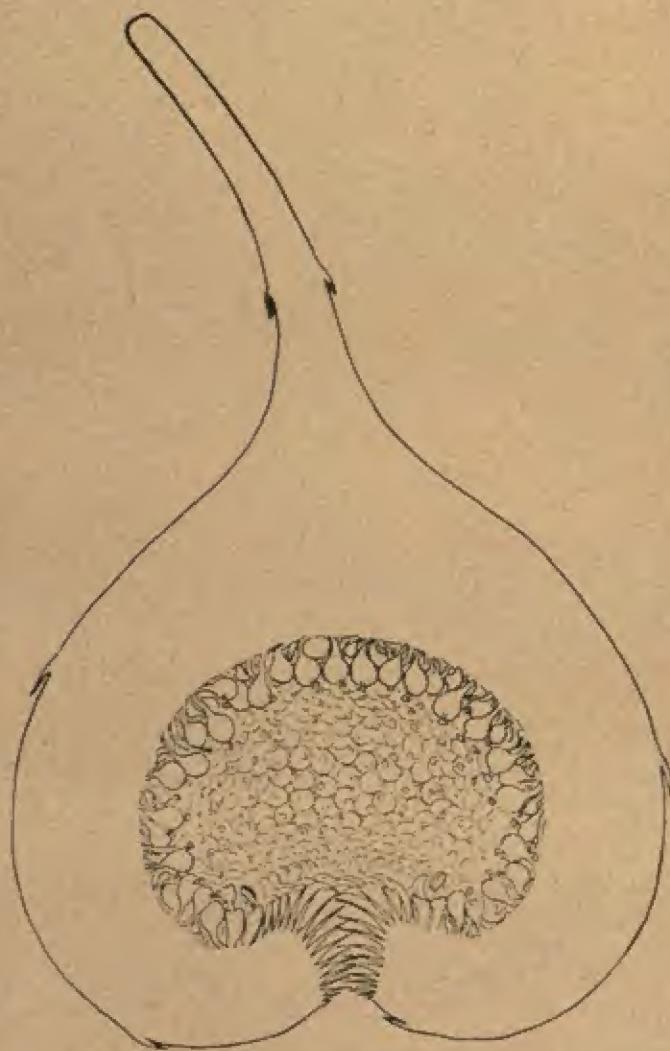
Receptacles geocarpic, on long leafless stolons

F. Beccarii, *F. chamaecarpa*, *F. cunii*, *F. geocarpa*

The receptacles differ also in colour, size, shape, hairiness, and form and number of the apical scales, on which characters the malayan species are readily distinguishable, as shown in the key on p. 62. Typically in Covellia the receptacles ripen yellow to russet-brown: the geocarpic species are exceptional.

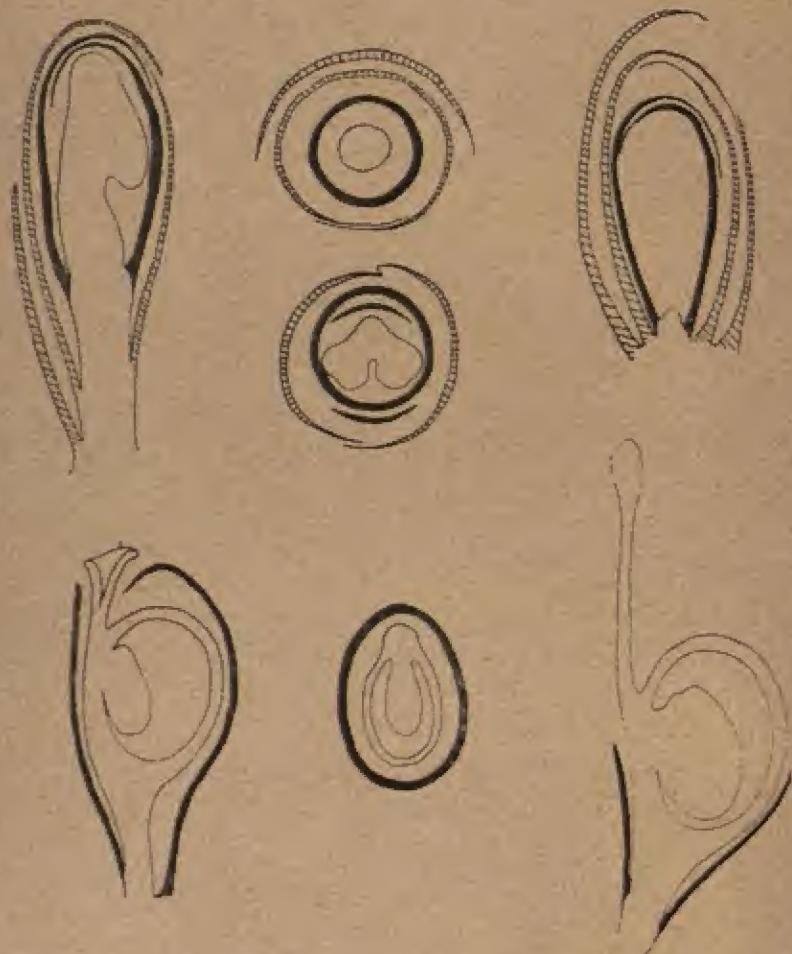
The Flowers. The flowers are borne separately over the whole of the inside of the receptacle without any tendency to aggregation or the formation of minor inflorescences. One set of receptacles contains the gall-flowers and male flowers; the other contains the female flowers and neuter flowers, which appear to have been overlooked hitherto, although they correspond with the male flowers in the gall-receptacles. The male flowers are arranged in one or two circles round the mass of internal bracts which close the orifice and the gall-flowers occupy the rest of the surface, as shown in Text-Fig. 3. In the female receptacles there is the same arrangement with one circle only of neuter flowers. Thus the male and neuter flowers are relatively few and morphologically they are the lowest in the inflorescences: but the male flowers invariably open long after the gall-flowers have developed, and, as King

observes, just as the wasps are hatching and the receptacle is ripening. The structure of the flowers is very simple in accordance with their minute size and restricted development.



Text-Fig. 3. A diagrammatic section of a Covellia gall-receptacle with two circles of male flowers.

The Female Flowers. A typical female flower is shown in section in Text-Fig. 4. There is a shortly stalked, unilocular ovary with one suspended, anatropous ovule and a lateral style with simple, clavate, papillate stigma. The ovary is surrounded by a small membranous gamophyllous perianth with an entire edge, which forms merely a ring or tube round the stalk of the ovary or a short cup covering its lower half. In *F. Beccarii* and *F. geocarpa* there is no perianth; in *F. cunia* it is partite with 5—7 lanceolate seg-



Text-Fig. 4. Diagrammatic sections of *Covellia* flowers; the perianth black, the bracteoles hatched. From left to right:—above, a male flower, a t.s. of a male flower a cross the filament and across the anther, a neuter flower; below, a gall-flower, a t.s. of a female flower, a female flower.

ments shortly gamophyllous at the base. The flowers may be sessile or stalked in the same receptacle. The style is glabrous or sparsely hairy with short, stiff, patent bristles just below the stigma. Gagnepain has used this character in distinguishing the species from Indo-China and it is useful when only female receptacles are available, but, like hairiness of the shoot, it has only specific value. Thus the style is hairy in *F. chamaecarpa*, *F. hispida*, *F. obpyramidata* and *F. Scortechinii*, and glabrous in the others, although sometimes minutely hairy in *F. fistulosa*. But the nature of the perianth is important and the species fall naturally into three groups in this respect with minor variations, as shown in the following table:—

Perianth cupular	
Perianth as a minute cup or ring round the ovary-stalk	
<i>F. chamaecarpa</i> , <i>F. Miquelii</i> , <i>F. obpyramidata</i>	
Perianth as a distinct cup often reaching the middle of the ovary	
<i>F. fistulosa</i> , <i>F. hispida</i> , <i>F. lepicarpa</i> , <i>F. Scortechinii</i>	
Perianth of 5—7 narrow segments	<i>F. cunia</i>
Perianth absent	<i>F. Beccarii</i> , <i>F. geocarpa</i>

One can read these states into an evolutionary series showing the loss of the perianth. It is best developed in the *F. fistulosa* group. In *F. obpyramidata* it is reduced to a tubular sheath round the stalk of the ovary; in *F. Miquelii* it sheaths only the lower half or two-thirds of the stalk; in *F. chamaecarpa* it sheaths only the lower quarter or forms a minute ring, easily overlooked, at the extreme base; and from *F. Beccarii* and *F. geocarpa* it has disappeared. *F. cunia* stands apart in this respect, as in several others, and it is doubtful if it is at all nearly related to the other species.

The Seeds. At maturity the wall of the ovary disintegrates and the seeds are liberated. The hard bodies containing the embryo in the ripe receptacle are not achenes, as they have been called, and by which term one understands an indehiscent, one-seeded fruit, but true seeds. In all, they are about 1 mm. long and they look like the seeds of *Phaseolus* in miniature. They are subreniform with the micropyle often surrounded by a prominent ridge in the hilum, more or less laterally compressed, with a narrow keel along the edge opposite the hilum, and with hard yellowish walls and a mucilaginous outer coat. The embryo is small, straight, with distinct cotyledons and radicle, and surrounded by a thin layer of endosperm. The species can be divided into three groups according to the marks on the testa:—

Seeds smooth, without a keel	<i>F. cunia</i>
Seeds with a keel and a ridge on each side of it	
	<i>F. Beccarii</i> , <i>F. geocarpa</i>
Seeds with a keel and rough or tuberculate sides	
Keel faint, sides rough or subtuberculate	
<i>F. chamaecarpa</i> , <i>F. Miquelii</i> , <i>F. obpyramidata</i> , <i>F. Scortechinii</i>	
Keel strong, sides tuberculate-reticulate	
<i>F. fistulosa</i> , <i>F. hispida</i> , <i>F. lepicarpa</i>	

The Gall-flowers. The structure of the gall-flowers is essentially like that of the female flowers, but the style is shorter, glabrous and dilated suddenly into a wide-mouthed funnel surmounted by the discoid, umbilicate, smooth stigma. As for the perianth the species fall into the same three groups, but in those in which it is gamophyllous it is much better developed and generally covers the ovary. In the young flowers it envelops the ovary and style as a transparent sack with a minute apical pore and, characteristically, in three species it suffers a local overgrowth on one side of the pore—that away from the style—which causes a small area to buckle into a prominent keel opposing the style: as the ovary enlarges the style projects through the apical pore. The keel is characteristic of *F. fistulosa*, *F. hispida*, and *F. Scortechinii*. In *F. obpyramidata* the perianth may cover only the lower half or third of the ovary, while in *F. chamaecarpa* it is further reduced and sheaths only the stalk or just embraces the base of the ovary. It is absent from *F. Beccarii* and *F. geocarpa*, and in *F. cunia*, according to King, it is similar to that of the female flower.

The Male Flowers. I find that the male flowers do not have the structure which has been assigned to them. King states, and later writers have followed his interpretation, that the male flower has a perianth of three closely imbricating, separate pieces. I think, however, that it is an error of observation, arising perhaps through the examination of opened flowers, and it would be strange surely if the male flowers had a perianth so different from the female. I find in all the malayan species, except *F. cunia* (which I have not been able to examine), that the perianth is gamophyllous and that there are in addition one or two bracteoles, the upper of which is generally bilobed and closely wrapped round the perianth in bud. When the flower opens, the stamen breaks through the upper bracteole as well as the perianth, sometimes cleaving them on one side, and thus the mature flowers may have the appearance which King described. The flowers are pedicillate and round, and their structure is shown diagrammatically in Text-Fig. 4: it is complicated by the lobing and infolding of the upper bracteole and perianth.

The lower bracteole is spatulate-ovate and sessile and surrounds the base of the pedicel, completely covering the young flower. It is clearly only one of the innermost bracts of the orifice and is absent from the second circle of male flowers, furthest from the orifice, when such occurs. It is generally absent from *F. Beccarii*, *F. geocarpa*, *F. obpyramidata*, and *F. Scortechinii*. In *F. lepicarpa* it is obscurely bilobed.

The upper bracteole is generally situated a short way up the pedicel. It is spatulate-ovate in its entire outline but it is swathed round the male flower with one edge appreciably overlapping the other, and it is generally shortly bilobed, the lobes being blunt,

concave, hooded and imbricating over the apex of the flower. In *F. Scortechinii* it is nearly entire. In *F. chamaecarpa* it is shortly gamophyllous at the base. In *F. Beccarii* and *F. geocarpa* it is quite peculiar and similar to the perianth, being gamophyllous and tubular with a small apical cleft which is sometimes elevated on a slight projection.

The bracteoles are ciliolate on the edge in *F. fistulosa*, *F. hispida*, *F. lepicarpa*, *F. obpyramidata* and *F. Scortechinii*.

The perianth is cupular with two spathulate, or ligulate, lobes abruptly set off and deflexed in the bud. The lobes are opposite and one is bent down to the outside and the other to the inside of the perianth, as shown in Text-Fig. 4. In *F. Beccarii* and *F. geocarpa* the perianth is tubular and prolonged apically into a flat tapering truncate appendage, perforated at the extremity, which is either erect, stuck through the cleft in the upper bracteole, or is deflexed and pressed to its inside.

The stamen has a stout filament and somewhat dorsifixed anther in all the species. It is the upthrust of the filament, as it extends, which ruptures the perianth and upper bracteole exposing the anther. The filament shrivels greatly in drying and does not regain its normal size on soaking out, which explains the spindly appearance of the stamens, with their relatively enormous anthers, in King's illustrations.

In several species there is at the base of the stamen, on the side to which the anther faces, habitually or occasionally, a minute bristle or a conical lump of tissue, which suggests a rudimentary ovary or abortive stamen: I have never seen that they develop into a recognisable organ. In *F. obpyramidata* there are 1—2 bristles and often a conical lump. In *F. lepicarpa* there is a bristle, which is often present also in *F. hispida*, rarely in *F. fistulosa*: *F. chamaecarpa* has rarely the conical rudiment.

The Neuter Flowers. In position and structure the neuter flowers correspond exactly with the male flowers. But, in all the species, they form a single ring only. They are very small, rarely exceeding .5 mm. long. They never open but remain enwrapped in the bracteoles and perianth, and they contain a minute knob or conical lump, which is presumably an abortive stamen.

The Size of the Flowers. The flowers grow while the receptacle enlarges but they do not reach full size until long after the receptacle. The perianth enlarges concurrently with the stamen or ovary until, in the male flowers, it is ruptured by the expanding filament. The style soon reaches its full size and does not grow after fertilisation though it persists on the enlarging ovary of both the female and gall-flowers. At maturity the flowers vary little in size in the different species; the sizes are scarcely distinctive, but the general agreement may be useful in comparison with other subgenera. The male flower, before the stamen extends, varies 2.5—4 mm. high, being smallest (2—3 mm.) in *F. fistulosa*, *F. lepicarpa* and *F.*

Scortechnii, and largest (3.5—4.5 mm.) in *F. Beccarii*, *F. geocarpa* and *F. hispida*. The stamen varies 1.5—3.5 mm. high with the anther 1—1.5 mm. long; it is shortest (1.5—2 mm.) in *F. fistulosa* and *F. Scortechnii*. The gall-flowers vary 2—8 mm. high, being largest (3—8 mm.) in *F. Beccarii* and *F. geocarpa*, and smallest (2—4 mm.) in *F. lepicarpa* and *F. Scortechnii*; the style is about .5 mm. long in all. The female flower varies 2.5—6 mm. high, being longest (3.5—6 mm.) in *F. Miquelii* and shortest (2.5—3.5 mm.) in *F. Scortechnii*; the perianth varies .5—1.7 mm. long according to its state of development in the different species; the style varies 1—1.7 mm. long. *F. Scortechnii* has the smallest flowers and *F. Beccarii* and *F. geocarpa* have the largest.

Internal Bristles. In *F. cunia*, *F. obpyramidata* and *F. Scortechnii* there are numerous minute bristles, up to 1 mm. long, among the flowers on the wall of the receptacle. They are diagnostic and apparently unconnected with the hairiness of the style, though probably with hairiness of the shoot and exterior of the receptacle. Thus, *F. obpyramidata* and *F. Scortechnii* have hairy styles but *F. cunia* has not, and while *F. chamaccarpa* and *F. hispida* have, they both lack the internal bristles. *F. pomifera*, in Neomorphe, is also contrary and agrees with *F. cunia*.

The Colour of the Flowers. In all but the geocarpic species, in which they are colourless, the bracteoles and perianth are wine-red at first, as in the edible fig.

Dioecism. All the species are dioecious: a plant bears either gall-receptacles or female receptacles. I have determined this by examining many living plants of each species with the exception of *F. cunia*, and in this case, as in the others, the herbarium-specimens have either female or gall-receptacles. Moreover I have watched successive crops of fruit on twelve plants of *F. fistulosa* and find them constantly gall-plants or female plants. Apart from the edible fig, *F. carica*, the dioecism of which is well-known, the condition in other species with two kinds of receptacle appears to be unknown, although it is implied that they are monoecius and dichrous, the one plant bearing both kinds of receptacle. King remarks that the receptacles on the trunk and main branches in *F. fistulosa* are generally female, supposing that the rest are gall, but this is mistaken. It will probably be found that dioecism is the rule when there are two kinds of receptacle and that monoecism is exceptional outside the subgenus *Urostigma*. The point must be decided in the field where one can watch a plant over several seasons.

As I will show under *F. fistulosa* (and *F. variegata* in Neomorphe) the gall-receptacles develop and ripen in two-thirds of the time required by the female receptacles, which persist on the plant full-sized for a month or so longer. And this may explain

why collections of the female plants are generally more numerous; they will carry their receptacles longer and being more likely to catch the eye of the collector.

The Leaves. The shape, position and hairiness are only specific characters. A key to the malayan species on the vegetative parts is drawn up on p. 63. The leaves are more or less oblong and mesophytic and, in the dried state, the primary and secondary veins are prominent and the tertiary and quaternary veins generally distinct but not raised. The petioles in *F. fistulosa* and *F. obpyramidata*, and the receptacles in *F. Miquelii* and *F. obpyramidata*, soon become thinly brownish scurfy owing to the drying of the epidermis, which then scales off in small flakes; they probably have a subepidermal periderm as La Rosa has found in other species of *Ficus* (?).

An interesting fact emerges in correlating three distinct sets of data usually given in specific descriptions, and is shown in the following table:—

Leaf-base cuneate, 3—veined; secondary veins irregularly reticulate	
	<i>F. Beccarii</i> , <i>F. fistulosa</i> , <i>F. Miquelii</i> , <i>F. Scortechnia</i>
Leaf-base more or less cordate, 5—7-veined; secondary veins	
straight, parallel	<i>F. chamaecarpa</i> , <i>F. cunio</i> , <i>F. geocarpa</i> , <i>F. hispida</i> ,
	<i>F. lepicarpa</i> , <i>F. obpyramidata</i>

That the number of basal veins should increase as the base of the leaf enlarges relative to the rest of the lamina is understandable, but not why expansion of the lamina should straighten the secondary veins. *F. Beccarii* is intermediate; the leaf-base is rounded cuneate with a conspicuous pair of veins on each side of the midrib and two minute ones. The shape of the lamina and the number of primary lateral veins are independent factors, though in any one species the longer the lamina generally the greater the number of primaries.

Habit. The one noteworthy deviation from the general habit of the small cauliniflorous tree with wide-spreading branches is the geocarpic, which is peculiar to the section and, apparently, to the east. About 17 geocarpic species of *Ficus* have been described, chiefly from Malaysia, Borneo and the Philippines, but they must frequently have escaped collection since the fruit is not obvious and this is certainly the reason why three species are here recorded for the first time from the peninsula. They are among the strangest members of the genus, for how are their flowers pollinated underground and what animals eat the fruit and scatter the seeds? Their affinities are far from evident, but they should be indicated by the structure of the flowers and receptacles. The habit may be homoplastic and vary in detail: thus it does not appear that all the species are stoloniferous. A similar geocarpic habit is known in *Polyalthia hypogea* (Anonaceae) from Malaya, and in *Saurauia*

callithrix (Ternstroemiaceae), *Cyrtandra geocarpa* and *C. hypogaea* (Gesneraceae) described by Koorders from Celebes (6a): the first two are small trees and the species of *Cyrtandra* are shrubs.

With the one exception of *F. fistulosa*, all the malayan species are lowland plants and occur but rarely, if ever, above 1500 ft. alt. Burkhill found *F. Scortechinii* at 1800 ft. on G. Tampin, in N. Sembilan, and I have seen *F. chamaecarpa* at 2200 ft. on the road to Fraser's Hill, in Selangor. But *F. fistulosa* is abundant in the mountains, at least up to 5000 ft., as well as in the plains and it appears to have a small-leaved montane variety.

Conclusion.

The malayan species fall into three groups, the interrelations of which are not clear—whether, for instance, they form a natural subgenus. The third group, as evaluated below, represents the typical *Covellia* and its species are certainly closely allied. The first group stands apart in the unspecialised structure of the receptacle, which has numerous lateral bracts and no collar, coupled with such advanced features as the absence of the peduncle and the loss of the perianth in the gall- and female flowers. The second group is distinct in the partite perianth, the smooth testa and the colour of the ripe receptacles, in which respects it approaches nearer the section of *Neomorphe* which contains *F. variegata*.

Group 1. Geocarpic; receptacles subsessile, without a distinct collar, basal and lateral bracts numerous, densely villous, ripening dark reddish brown; male flowers with tubular bracteole and perianth; gall- and female flowers without a perianth; seeds with a prominent keel and a ridge on each side of it, not tuberculate.

F. Beccarii, *F. geocarpa*

Group 2. Geocarpic; receptacles pedunculate, with three basal bracts in a collar and several lateral bracts, ripening rose-red; male flowers?; perianth of gall- and female flowers with 4–7 segments; seeds smooth, without a keel.

F. canina

Group 3. Geocarpic, caulinorous or with the receptacles axillary; receptacles sessile or pedunculate, with a collar of 3 basal bracts, with or without lateral bracts, male flowers with a bilobed upper bracteole and a bilobed cupular gamophyllous perianth; gall- and female flowers with a cupular, gamophyllous perianth, that of the female flower often reduced; seeds with a keel and rough or tubercular sides.

Subdivision A.

Receptacles axillary, sessile, with lateral bracts, ripening yellowish.

F. lepicarpa

Subdivision B.

Receptacles caulinorous on leafless branches, pedunculate, with lateral bracts, ripening yellowish; style of female-flower subcylindrical-umbilicate.

F. hispida

Subdivision C.

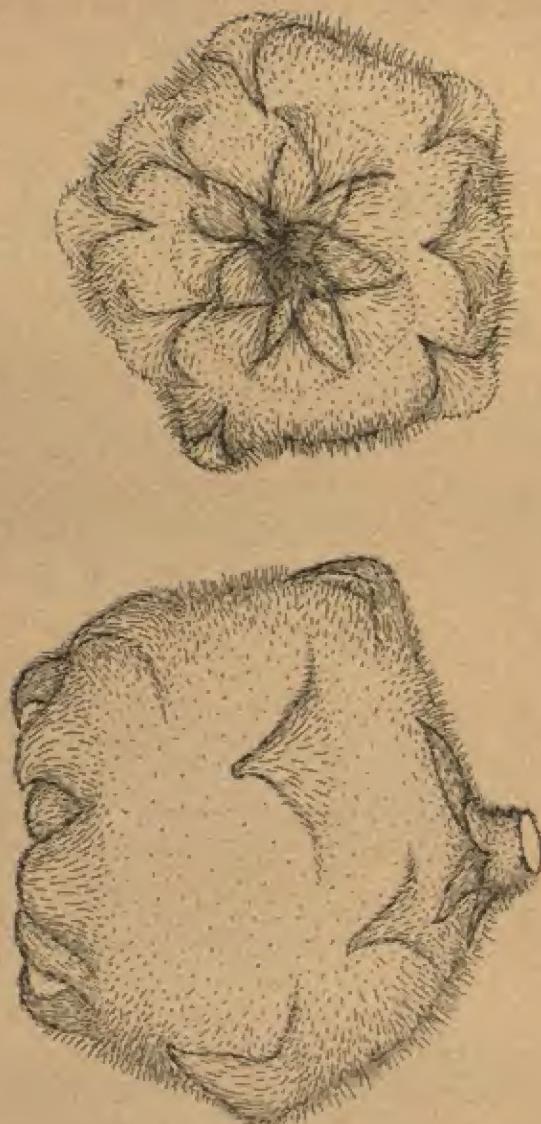
Receptacles caulinorous on long or short leafless twigs, pedunculate, without lateral bracts, ripening yellowish or brownish.

F. fistulosa, *F. Miqueliană*, *F. obpyramidalis*, *F. Scortechinii*

Subdivision D.

Receptacles geocarpic, pedunculate, without lateral bracts, ripening blackish green.

F. chamaecarpa



Text-Fig. 5. The receptacle of *F. geocarpa*, x 3.

SPECIFIC NOTES.

Ficus geocarpa Teysm.

Shrub or small tree up to 15 ft. high, often gregarious; stems single or tufted, up to 4 in. thick at 1 ft. from the ground.

All parts, at least when young, densely hairy with white or pale brown stiff spreading hairs, 1–2.5 mm. long, more or less adpressed on the stipules,

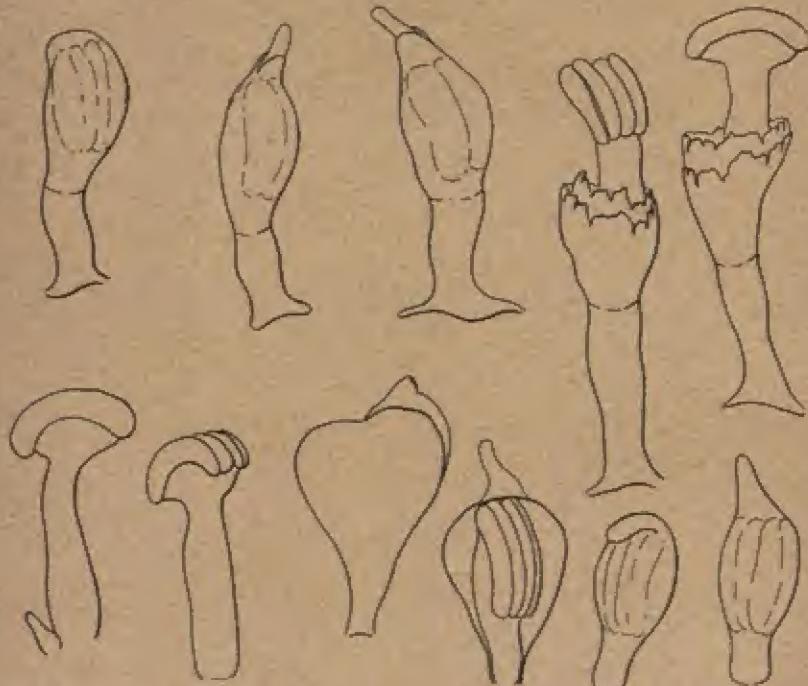
midrib, upperside of the leaf and receptacular bracts; upperside of the leaves rather hispid-scabrid, less hairy than the underside, sometimes glabrescent; hairs longest and with a swollen base on the petioles and twigs.

Leaves alternate, drooping, oblong-elliptic or oblong-obovate, often slightly unequal-sided, narrowed abruptly to a serrate acuminate tip, 12–24 mm. long; blade 10–36 x 4–14.5 cm., with 5–7 pairs of primary veins, secondary veins transverse, parallel and conspicuous; base deeply and unequally cordate, broadly auricled on the postaxial side, with 6–8 veins, the postaxial lobe with usually a small extra vein; edge serrulate, usually coarsely dentate towards the tip, sometimes entire especially near the base; petiole short, 6–15 mm. long; stipules broadly lanceolate, subsessile, 15–30 mm. long.

Receptacles geocarpic on long leafless, stipuliferous, branching, superficial or subterranean stolons arising from the base of the trunk up to 4 ft. from the ground; stolons up to 30 ft. long x 1 in. thick at the base; receptacles singly or in pairs, axillary, generally subterranean, subsessile, depresso-globose, mostly 20–26 mm. wide x 17–20 mm. long, occasionally up to 4 x 3.5 cm., densely hispid with pale brown stiff hairs, 5–1 mm. long, white at first, becoming pink and finally dark red-brown or blackish brown with conspicuous white lenticels; peduncle 5–4 mm. long; basal bracts 3–7, indefinite, lanceolate, adpressed, 3–7 x 1.5–3 mm.; lateral bracts numerous, indefinite, scattered, over the body, crowded round the orifice, 3–6 mm. long x 3–7 mm. wide, with a strongly incurved tip; orifice depressed, concealed by hairs, closed by numerous apical bracts; internal bristles absent.

Female flowers 3–4 mm. long, with long pedicel, no perianth, glabrous; style long, 1.5 mm., slender glabrous, with a long subclavate stigma; seeds yellow, with a keel and a ridge on each side of it, not tuberculate.

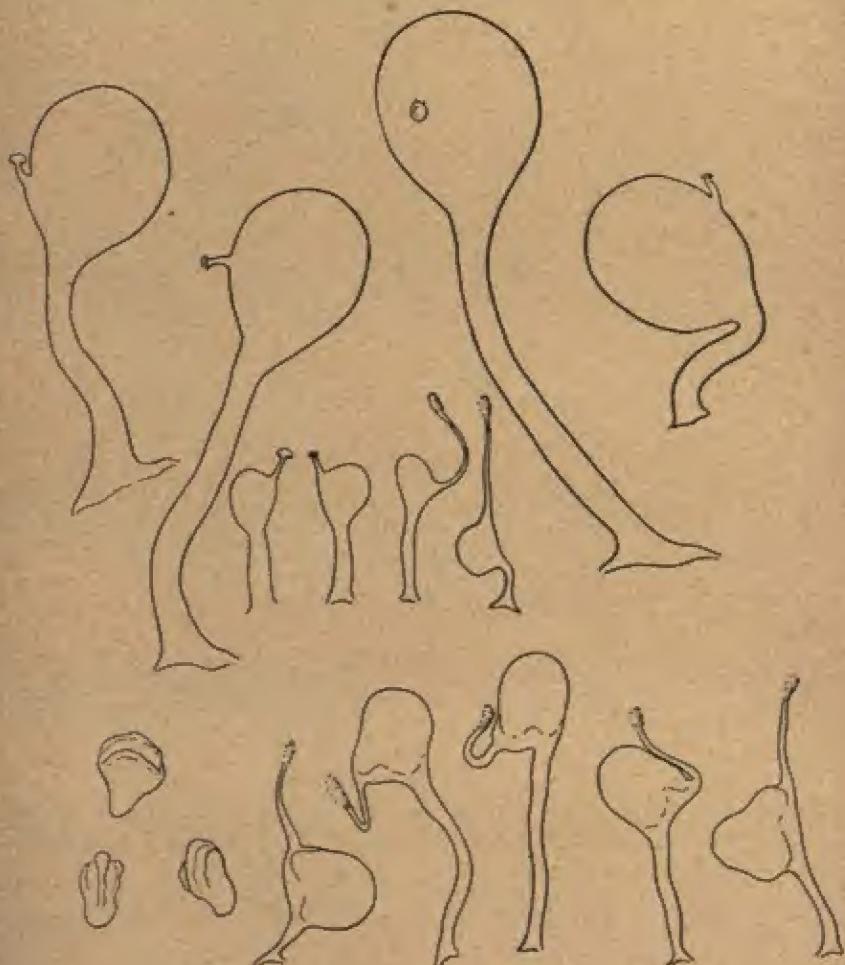
Gall-flowers, as the female flowers but larger, 3–8 mm. long; style short, 3–5 mm.



Text-Fig. 6. The male flowers of *F. geocarpa*, x 10.

Male flowers 3.5–4.5 mm. long, in 2 circles; lower bracteoles generally absent; upper bracteole gamophyllous, tubular, sheathing the perianth and opening by a small apical cleft often slightly produced distally; perianth gamophyllous, tubular, produced into a flattened conical apical appendage with a minute terminal slit, deflexed within the upper bracteole or projecting through its apical cleft; stamen often with a short conical rudiment at its base.

Collections.—Wray, s.n., near Tapah, Perak (det. *F. cunia*): Ridley 11036, female (det. *F. cunia*): S. 25946, female.



Text-Fig. 7. *F. geocarpa*:—above, 4 mature gall-flowers, 2 young gall-flowers and 2 young female flowers; below 3 seeds, 5 mature female flowers; $\times 10$.

This species is very abundant up to 1000 ft. altitude on the passes of the main range in N. Sembilan and Selangor, along the road between Kuala Pilah and Bentong, and on the forest track between S. Nipah and B. Kajang in Kemaman. It grows at the edge of the forest-clearings, neither in the full open nor in the deep shade. It has been reported from Borneo and Celebes but not yet from Malaya, although it will probably be found one of our common species. The latex in the stem is very scanty. The gall- and male flowers were not previously described. The plant described from Celebes as *F. geocarpa* by Koorders (6a), must be a different species and possibly *F. hypogaea*; he states that it is a small tree, up to 10 m. high, with greenish black receptacles. King states that the receptacles are covered with brown hairs, as in the malayan specimens, and I have followed his description.

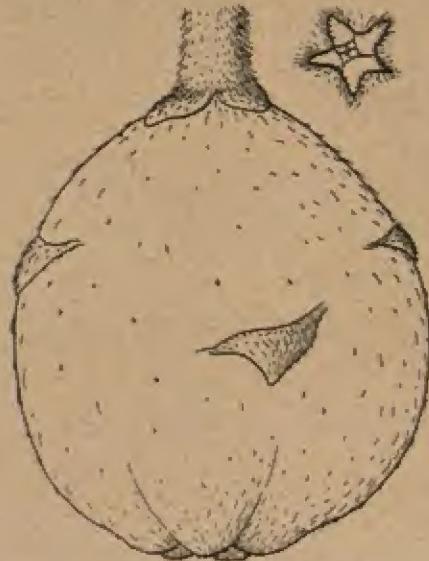
F. Beccarii King

In habit, receptacles, flowers and seeds identical with *F. geocarpa* but differing as follows:—

Hairs on the shoots shorter, up to 1 mm. long, adpressed though more or less patent on the underside of the lamina.

Lamina oblanceolate, much narrower, 15—33 x 2.8—6.7 cm.; *upperside* glabrous; *primary veins* 6—9 pairs; *edge* entire or minutely serrulate, and mostly only near the tip; *apex* produced into a very long, parallel-sided tip, 3—7 cm. long; *base* equal, rounded cuneate to narrowly subcordate, not auricled, 3—5 veined; *petioles* very short, 4—8 mm. long.

Collections:—S. 19037, Borneo, female, det. E. D. Merrill; S. 25943, female.



Text-Fig. 8. The receptacle of *F. cunia*, x 3.

This species appears as widely distributed in Malaya as *F. geocarpa* and as common, though not yet reported from the country; previously it was known only from Borneo. The length of the 'drip-tip' is remarkable. Neither gall- nor male flowers have formerly been described; they are indistinguishable from those of *F. geocarpa*. These two species, in fact, appear identical apart from the leaves but there may be anatomical differences. Note-worthy, also, is the fact that the leaves of young plants are distinctly, though slightly, inequilateral and thus point the way to *F. geocarpa*.

F. cunia Ham.

Habit as *F. geocarpa*, possibly bigger, (S. 10277, 'a small tree, 15—25 ft.'), ? stoloniferous.

Hairs as *F. geocarpa* but shorter, up to 1 mm. long, more or less adpressed on the twigs and petioles, subvillous on the leaves.

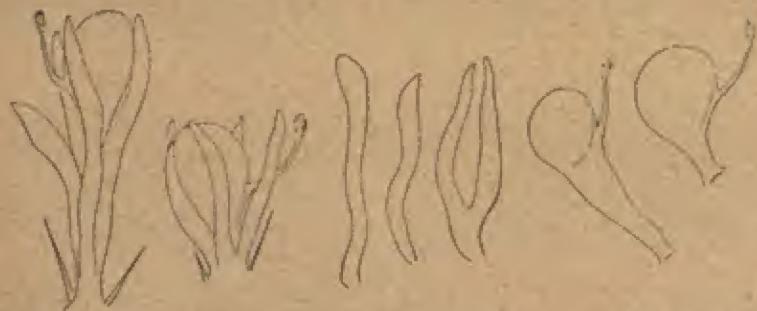
Leaves as in *F. geocarpa*, often rhombic, 12—28 x 4—11 cm.; *primary veins* 9—14 pairs; *edge* often coarsely serrate in young plants; *base* with a stronger, wider articulation, with 7—9 veins; *petiole* 8—17 mm. long; *stipules* 20—35 mm.

Receptacles shortly pedunculate, pyriform, ca. 18 mm. wide, red with white spots (Ridley 2321), adpressedly hairy when young, glabrescent; *peduncle* 2—4 mm. long; *basal bracts* 3 in a collar, obtuse, 2—2.5 mm. long; *lateral bracts* few, small, adpressed, scattered; *orifice* scarcely depressed, with 5—6 adpressed peripheral apical bracts, closed by numerous internal bracts; *internal bristles* numerous, 5—1 mm. long; *internal scales* scattered between the flowers, numerous, small, lanceolate, 5—15 mm. long.

Female flowers 2.5—4 mm. long, sessile or stalked, with a perianth of 4—7 narrow, often curved, lanceolate, glabrous pieces shortly gamopetalous at the base; *style* slender, 1 mm. long, glabrous, with a narrowly subulate, simple stigma; *seeds* subglobose, slightly flattened, without a keel, smooth.

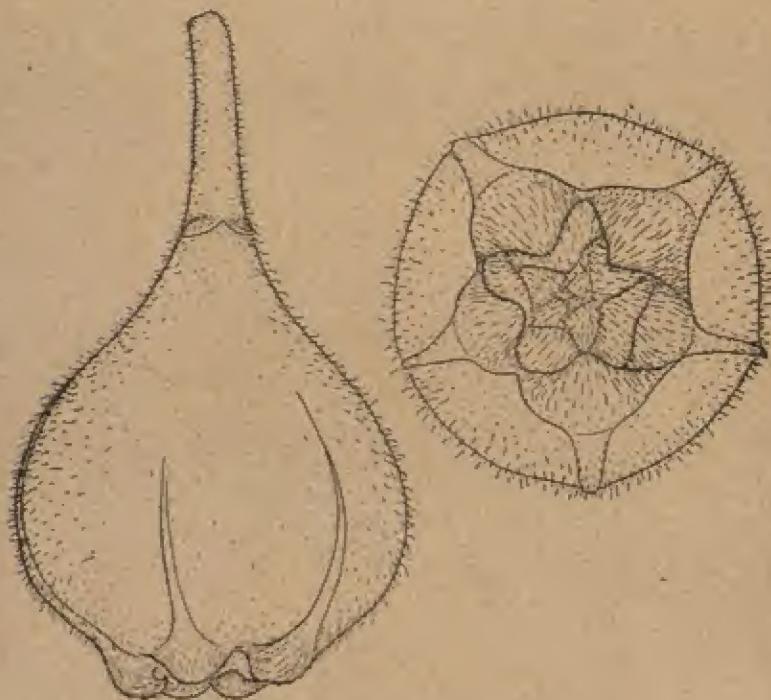
Male and gall-flowers not seen.

Collections:—Scortechini 1601; Ridley 2321, 8513, 14543; S. 10277; all female.



Text-Fig. 9. *F. cunia*:—2 mature female flowers with bristles, 4 perianth-segments, 2 mature pistles; x 10.

This species has been found in Selangor, Pahang, Perak and Kelantan, but does not seem common. Although vegetatively it is like *F. geocarpa* with large unequally cordate leaf-bases and short petioles, the receptacles and flowers have a very different structure. It is peculiar in having scales between the flowers, c.f. Eusyce. Both King and Gagnepain state that the stigma is bifid: this I have not seen in the malayan specimens despite repeated inspection. According to Ridley the fruit is edible.



Text-Fig. 10. The receptacle of *F. chamaecarpa*, $\times 3$.

F. chamaecarpa Ridley Kew Bull. 1926, 82.

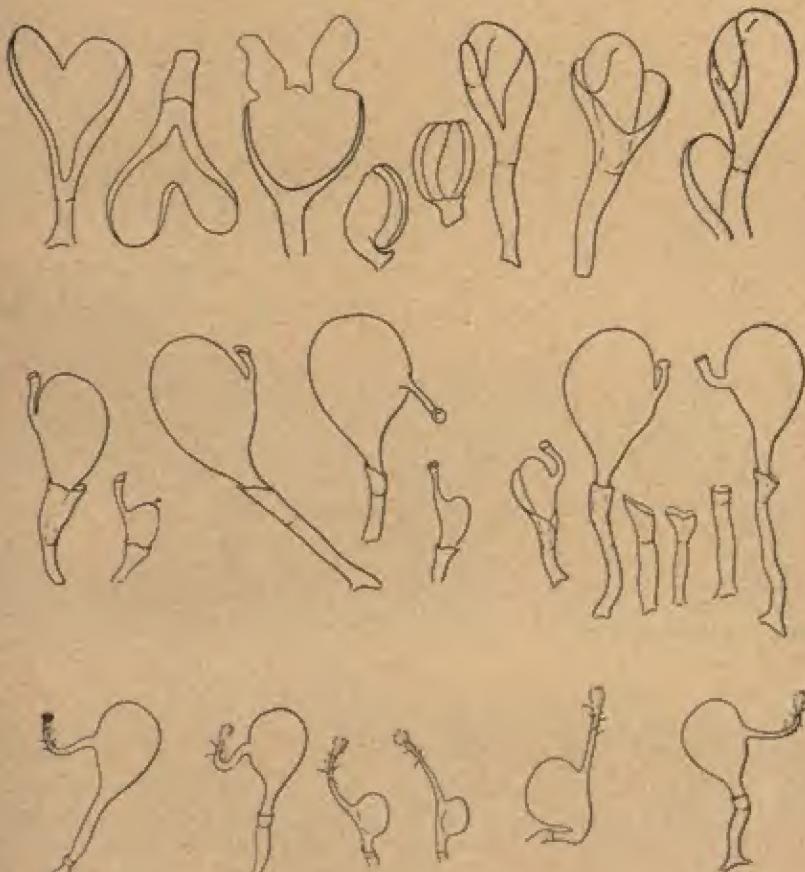
Habit as F. geocarpa.

Young shoots wholly densely hispid with dark brown or blackish rigid hairs, 5–1.5 mm. long, patent, often incurved: twigs glabrescent; the petiole and underside of the lamina persistently dark hairy; the upper side scabrid rough with short stiff more or less adpressed hairs, and the midrib and veins on the upper side shortly tomentose with similar colourless hairs.

Leaves alternate, occasionally opposite; blade broadly elliptic or sub-ovate, slightly inequilateral, 13–29 x 4.5–11.5 cm., abruptly tapered to a sub-parallel-sided tip, 12–30 mm. long; primary veins 7–9 pairs; secondary veins transverse, parallel; edge closely serrate, often nearly entire towards the base; base unequal, deeply cordate-auriculate on the postaxial side, occasionally subequal and subcordate, with 5–7 veins, 2–4 often minute; petiole 15–30 mm. long; stipules lanceolate, 16–25 mm. long.

Receptacles borne as in *F. geocarpa*; shortly stalked, broadly ellipsoid or subglobose, the body 15—17 mm. long, often with a slight neck, with 4—5 prominent longitudinal ridges reaching from the apex and disappearing about the middle, rather densely hispid with dark brown or black stiff patent hairs, at first white, then dingy olive, finally dark greenish black when ripe; *peduncles* 5—14 x 1.5—2 mm., more or less dilated upwards; *basal bracts* 3, in a collar, obtuse, 1—2 mm. long, frequently 1—2 displaced up the body, rarely all three displaced and joined by a faint transverse line; *lateral bracts* absent; *orifice* ca. 5 mm. wide, umbilicate, closed by many internal scales, with 3—5 prominent subtubercular, adpressedly hairy *apical scales* with incurved tip terminating the ridges and arched round the orifice; *internal bristles* absent.

Female flowers 2—2.5 mm. long, with long or short pedicel, rarely sessile; *perianth* very short, 1—2 mm. long, tubular, entire, sheathing



Text-Fig. 11. *F. chamaecarpa*. From left to right:—top-row, 2 upper bracteoles, the perianth of a male flower cut open, 2 immature stamens; second row, 5 mature gall-flowers, 3 immature, 3 pedicels with perianths; bottom row, 4 mature female flowers, 2 immature; x 10.

the lower quarter of the ovary-stalk or as a ring at the base only, not reaching the ovary; ovary with a long stalk; style 1 mm. long, hispid with a few patent hairs below the simple subclavate stigma; seeds yellow, with a faint keel and subtuberculate sides, mucilaginous when fresh.

Gall-flowers 3—4 mm. long, pedicel long; *perianth* gamophyllous, entire, sometimes indistinctly bilobed, 2—8 mm. long, cylindric and sheathing the stalk of the ovary to its base, or slightly dilated above and just embracing the base, rarely spatulate-elongate on one side and reaching to the middle of the ovary; style short, glabrous, shortly infundibuliform.

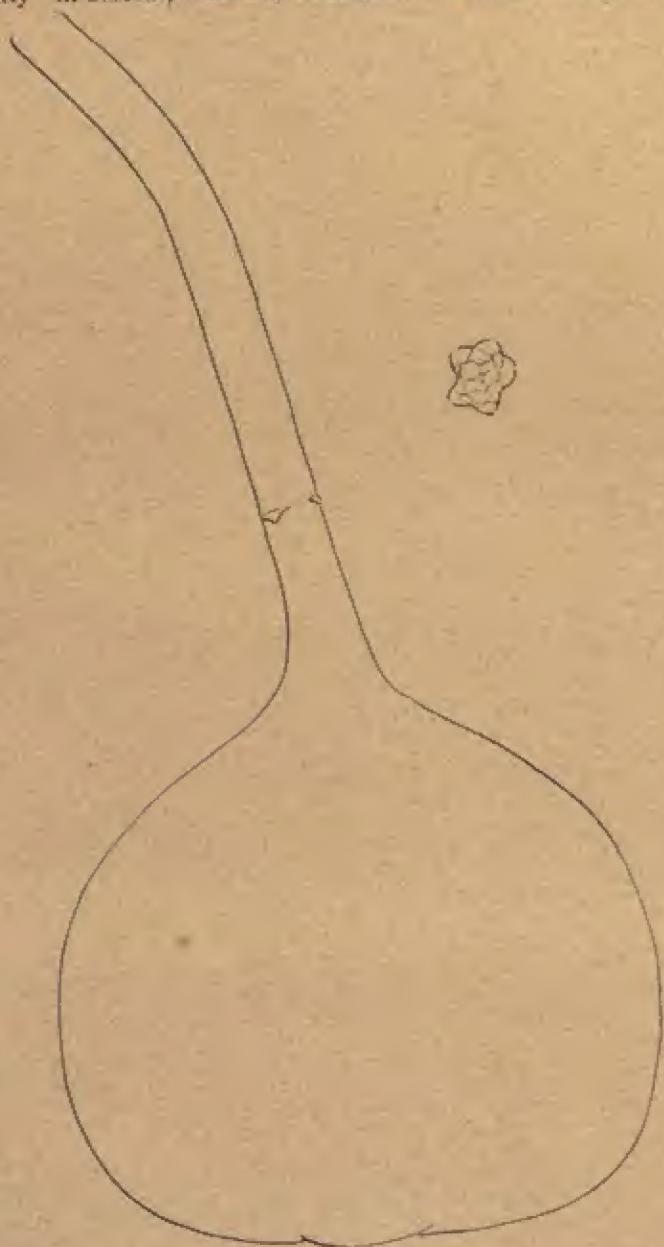
Male flowers 3—3.5 mm. long; *lower bracteole* spatulate-ovate, entire, glabrous, present only round the extreme base of the flowers nearest the orifice; *upper bracteole* shortly gamophyllous and tubular at the base, with two elongate-spatulate, slightly hooded, imbricate lobes more or less completely covering the perianth and with entire glabrous edges; *perianth* as in *F. fistulosa*; *stamen* 1, rarely with a minute conical rudiment at the base.

Collections:—female, Ridley 2588 (det. *F. cunia*), S. 14675 (isotype at Singapore); gall, S. 26031; Hume 9544, shoots only, the receptacles being *F. Beccarii* or *F. geocarpa*, (det. *F. cunia*).

In the original description Ridley states that the leaf-base is scarcely oblique, neither cordate nor auricled, and that the hairs are adpressed. This is not generally the case, even in the isotype at Singapore, though some of the leaves on the uppermost shoots of old plants tend to such a state. There is considerable variation in the shape of the leaf-base which is occasionally subcordate and subequilateral even on the young shoots, but it is typically very oblique as in *F. geocarpa*. Ridley remarks that the female flowers most closely resemble those of *F. Treubii* and suggests a near relation between them. According to King the style is hairy and the perianth absent in *F. Treubii*, which are points of agreement, but the uppersides of the leaves and the receptacles are glabrous and the leaf-base is equilateral. Curiously enough in Ridley 2588 the styles of the female flowers are glabrous, but in all other respects the collection is typical. On the other hand, Merrill's description of the philippine species, *F. mirabilis*, reads very similar to that of *F. chamaecarpa* (8); it appears to differ only in the equal leaf-base and sessile receptacles, though the flowers have not been described. *F. casigurensis* is also close but differs in the long petiole and equally cordate leaf-base. Both are geocarpic and have the stiff blackish brown hairs, which distinguish them at a glance from *F. Beccarii* and *F. geocarpa*. *F. Bernaysii* from New Guinea may also be allied but it is fulvous tomentose with a better developed perianth reaching the base of the ovary and with shorter fruiting branches, as in *F. Miquetii*; it suggests the stage preceding the geocarpic. It is clear that these species may form a distinct group which has independantly evolved the geocarpic habit. The resemblance between *F. chamaecarpa* and *F. Scortechnii* may only be superficial; both have hairy styles to the female flowers and similarly shaped receptacles but the fruits ripen very different colours and this point seems to be important.

Although so lately discovered, *F. chamaecarpa* is as common in Malaya as *F. geocarpa* and *F. Beccarii*, and it grows in similar situations; all three may be found side by side, and that is doubt-

less why Hume's collection was mixed. It has not been reported previously from Malaya and was known only from the 'type-locality' in Siberut, Sumatra, as a collection of a female plant.



Text-Fig. 12. The receptacle of *F. fistulosa*, $\times 3$.

F. fistulosa Reinw.

A small tree up to 30 ft. high with pale yellow latex; young twigs hollow, easily snapped.

Wholly glabrous when adult; the very young leaves, stipules and young receptacles sometimes minutely pubescent; sometimes with a few short stiff adpressed white or pale brown hairs at the base of the petiole.

Leaves membranous to subcoriaceous, alternate, occasionally opposite, elliptic to obovate-elliptic, rarely subrhombic, rather suddenly contracted to a short blunt narrow subacuminate tip up to 12 mm. long; blade 8—33 x 2.5—15 cm., with 4—8 pairs of primary veins; edge entire or subserrate



Text-Fig. 13. *F. fistulosa*. From left to right:—top-row, 2 unopen male flowers with the bracteoles removed, an open flower with the bracteoles and perianth removed, a section of an open male flower, an open and 2 unopen male flowers with bracteoles and perianth; second row, a basal bracteole and 2 upper bracteoles of a male flower, a neuter flower, the perianth of a male flower cut open; bottom-row, 4 gall-flowers (one immature), 4 female flowers; x 10.

especially when young; base cuneate, equal, with 3 veins; petiole stout, 5–6 cm. long x 2–4 mm. thick, soon becoming brown scurfy; stipule 5–8 mm. long, lanceolate.

Receptacles in clusters on the stem and main branches, on tubercles of short leafless branches up to 4 cm. long, occasionally singly or in pairs in the leaf-axils; pyriform, with or without a neck, glabrous, smooth except for the small brownish lenticels, ripening pale yellow or greenish yellow, the body 23–30 mm. long x 22–29 mm. wide, the neck 0–15 mm. long; peduncle 1–4 cm. x 1.5–3 mm.; basal bracts 3 in a collar, subtriangular, small, 5–1 mm. long; lateral bracts absent; orifice slightly depressed, closed by several internal bracts, with 5, rarely 4, peripheral apical bracts; internal bristles absent.

Female flowers 3.5–4.5 mm. long; perianth 5–1.5 mm. long, cupular, gamophyllous, entire, sheathing the ovary-stalk and covering the lower third or half of the ovary; style glabrous or sparsely and minutely hairy just below the simple subclavate stigma; seeds yellow, viscid, with a distinct keel and tuberculate-reticulate sides.

Gall-flowers 3–4.5 mm. long; perianth gamophyllous, cupular, entire, closely covering the ovary and with a small keel; style short, glabrous, 3–5 mm. long.

Male flowers 2–2.5 mm. long; lower bracteole entire, edge sparsely ciliolate; upper bracteole bilobed, hooded, covering the perianth, edge ciliolate; perianth 1–1.5 mm. long, gamophyllous, cupular, with 2 deflexed subspathulate lobes; stamen 1.5–2 mm. long, rarely with a bristle at the base.

Malay names: ara serapat (Pekan), kelampong bukit (Singapore).

There are two extreme forms of this species. The typical lowland form has large, shortly acuminate leaves with long petioles and the mountain form, which is *F. diphylla* Wall. according to King, has smaller leaves with longer, distinct tips and shorter petioles; in the mountain form the blade measures 3–15 x 1–5 cm. with the tip up to 25 mm. long and the petioles .5–2 cm. long. There are, however, intermediates which probably occur at intermediate altitudes. King was mistaken in saying that this form '*F. diphylla*', was common round Singapore, where only the broad-leaved form occurs. The malayan collections can be grouped as follows:—

Lowland form:—gall-plants; Ridley s.n. Changi, Singapore 1890; Ridley s.n. P. Ubin, Singapore 1893; Ridley s.n. B. Mandai, Singapore 1893; S. 4765, 12083, 23058. Female plants:—Ridley s.n. Chua Chu Kang, Singapore 1893; Langlasse 8089; S. 445, 938, 9050; Seimund s.n., P. Lalang, Perak, 1925; Strugnell 13190. Without receptacles:—Baker s.n. Mandai, Singapore 1917; S. 17288, 25983.

Mountain form:—gall-plants:—King's collector 6339; Wray 2072; Hanif 2355; S. 18923. Female plants:—Fox 99; Curtis 2600; Curtis s.n. Perak 1901; Scortechnii 274; Wray 922, 2937; Ridley 2983; S. 23630; Cubitt 6515. Without receptacles:—Scortechnii 1240.

Intermediate forms:—gall-plants:—Ridley 1175; S. 12731, 23575. Female plants:—2326; S. 7886, 23320, 23494.

This is one of the commonest figs in the country and it is very abundant in Singapore; it grows everywhere in thickets and on roadsides. But in the original state it must have been limited to secondary jungle along riversides and landslips. In fruit it is

very conspicuous from the clusters of yellow receptacles on the stem and branches, and vegetatively it can be recognised from the large, slightly obovate, glabrous leaves, hollow glabrous internodes and pale buff-coloured latex. King stated that *F. leucantotoma* was the only species known to him with yellow latex. The malayan species is certainly not *F. leucantotoma*, which has not been reported from the peninsula though so common in Java, but it appears that King did not fully understand *F. fistulosa*. Thus he states also that the receptacles are slightly dimorphic, which is not the case.

S. 25983 is a collection of a young plant the leaves of which are abnormal. They are ovate-spathulate to dagger-shaped, sub-angular, with the edge uneven and coarsely and distantly serrate; the blade is up to 35 cm. long, the basal third being more or less ovate, 7—10 cm. wide, and the remainder oblong lanceolate or ligulate, 3—6 cm. wide, with more or less parallel or irregular sides and tapering rather suddenly to a short tip; sometimes the leaf is wholly strap-shaped. Plants with such leaves are occasionally found; they may reach 8 ft. high before they begin to produce normal leaves, but I have not traced one to the mature stage: they may, of course, be hybrids which never attain maturity. The leaves of young plants are normally like those of the adult but bigger.

I have watched the development of the receptacles on 4 female plants and 3 gall-plants in Singapore over ten months, during which the female plants had each two crops of fruit and the gall-plants three or four. The period from their inception as minute green tips on the fruiting tubercles until maturity is 11½—12½ weeks in the case of the female receptacles and 7½—9 weeks in the case of the gall-receptacles. The crops, of each kind, succeed each other at irregular intervals, even on the same plant: there is generally a lapse of 1—3 weeks between the fall of the crop and the outgrowth of the new, but it may be as long as 3½ months or the new crop may begin as much as 3 weeks before the old crop matures, in which case the young and old receptacles occur side by side. Both kinds appear to reach their full size at the same rate and the delay in ripening of the female receptacles must be due to the growth of the embryos.

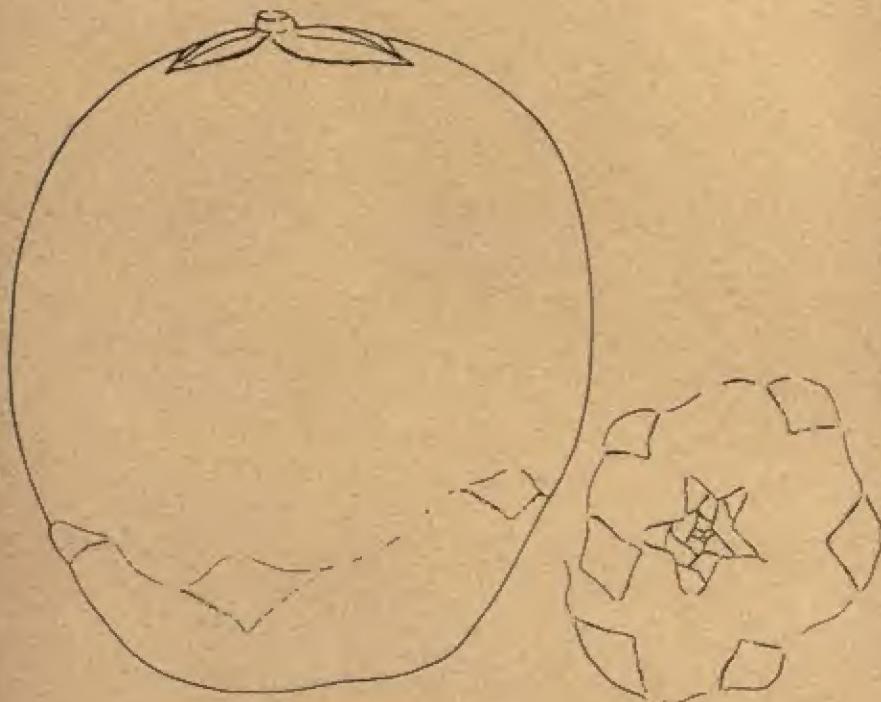
The plants are evergreen. The young leaves, which are pale pink, develop at irregular intervals independantly of the receptacles.

***F. lepicarpa* Bl.**

A small spreading tree up to 30 ft. high; latex white.

Young leaves silky beneath with short adpressed hairs on the midrib and main veins, thinly pubvillous on the midrib on the upperside; adult leaves more or less glabrous; petioles glabrous or with a few hairs when young; stipules generally with short adpressed hairs on the outside, often at the base only, occasionally nearly glabrous; internodes glabrous or with a few short adpressed hairs when young; receptacles thinly adpressedly hairy when young.

Leaves alternate or opposite, obovate-elliptic, gradually tapered to a fairly distinct tip up to 16 mm. long; edge entire; blade 11—32 x 4—13.5 cm., with 8—11 pairs of primary veins; secondary veins transverse, parallel; base narrowly cordate, rarely cuneate, equal, with 3 (—7) veins; petiole 1—5 cm. x 2—3.5 mm.; stipules 12—26 mm., broadly lanceolate, subpersistent.



Text-Fig. 14. The receptacle of *F. lepicarpa*, $\times 3$.

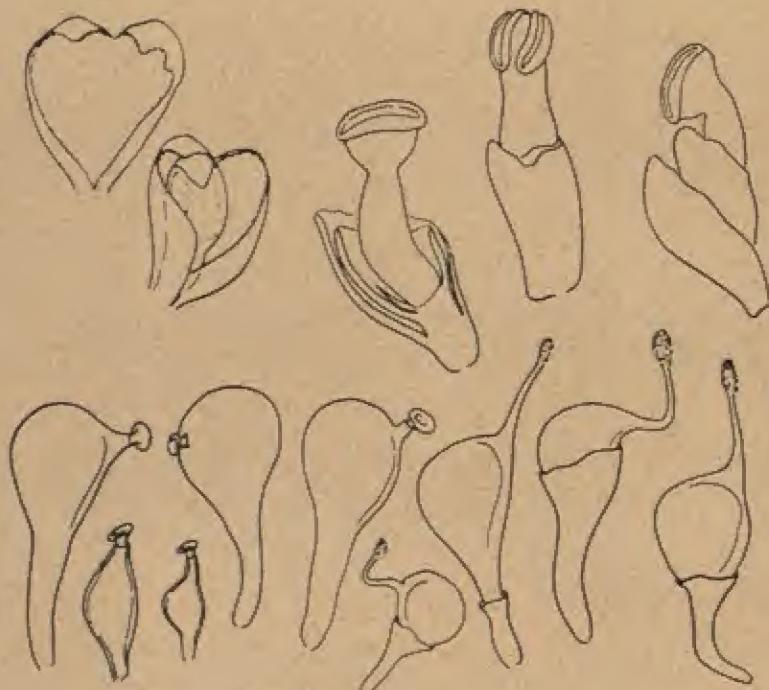
Receptacles axillary, singly or in pairs; sessile, ellipsoid or ovoid, often slightly constricted distally, often flattened or subangular from compression, soon glabrous, smooth, ripening pale yellow to pale brownish ochre; 23—30 x 20—27 mm.; peduncle absent; basal bracts 3 in a collar, rarely displaced distally, fairly large, broadly lanceolate, slightly keeled, acuminate, adpressed, with ciliolate edges, 4—9 x 3—6 mm.; lateral bracts prominent, 3—6, mostly 5 in a ring and joined by a fine line, beyond the middle or near the apex, occasionally drawn out in a spiral, similar to the basal bracts but smaller, 3—4 x 3 mm.; orifice slightly depressed, closed by numerous small internal scales, all with ciliolate edges; internal bristles absent.

Female flowers 3.5—4.5 mm. long; perianth, gamophyllous, tubular, entire, sheathing only the ovary-stalk or embracing the lower third of the ovary; style glabrous, 1.5 mm. long; seeds as in *F. fistulosa*, hilum with a conspicuous lip.

Gall-flowers 2.5—3.5 mm. long; perianth as in *F. fistulosa* but without a keel.

Male flowers as in *F. fistulosa*; bracteoles with ciliolate edges, the upper bracteole obscurely bilobed; stamen with a bristle at the base.

Collections. Gall-plants:—Ridley s.n., G. Pulai, Johore 1892; Hume 9720; S. 10332, 16877, 18857, 25757. Female plants:—Scortechnii s.n., s.l.; Wray 1983, 3532; Ridley s.n. Penang, 1900; Ridley 4152, 8501, 13716, 14553; S. 9897, 10843, 10968, 21703, 24823; Strugnell 13607. Receptacles very young:—Curtis 3513; S. 14160.



Text-Fig. 15. *F. lepicarpa*. From left to right:—above, an upper bracteole, an unopen male flower, 3 open male flowers (one in section); below, 3 mature and 3 immature gall-flowers, 3 mature, and 1 immature, female flowers; $\times 10$.

This species grows typically by streams or small rocky rivers in the lowland forest, overhanging the water, and not in the open. Apart from being the only malayan species of *Covellia* which is not caulinorous, it is easily known by the large obovate glabrous leaves with numerous primary veins, close and parallel secondary veins, and the large stipules. King remarks that gall-receptacles are rare, but this as already explained, is due only to the exigencies of collecting: gall-plants and female plants are equally abundant where they occur.

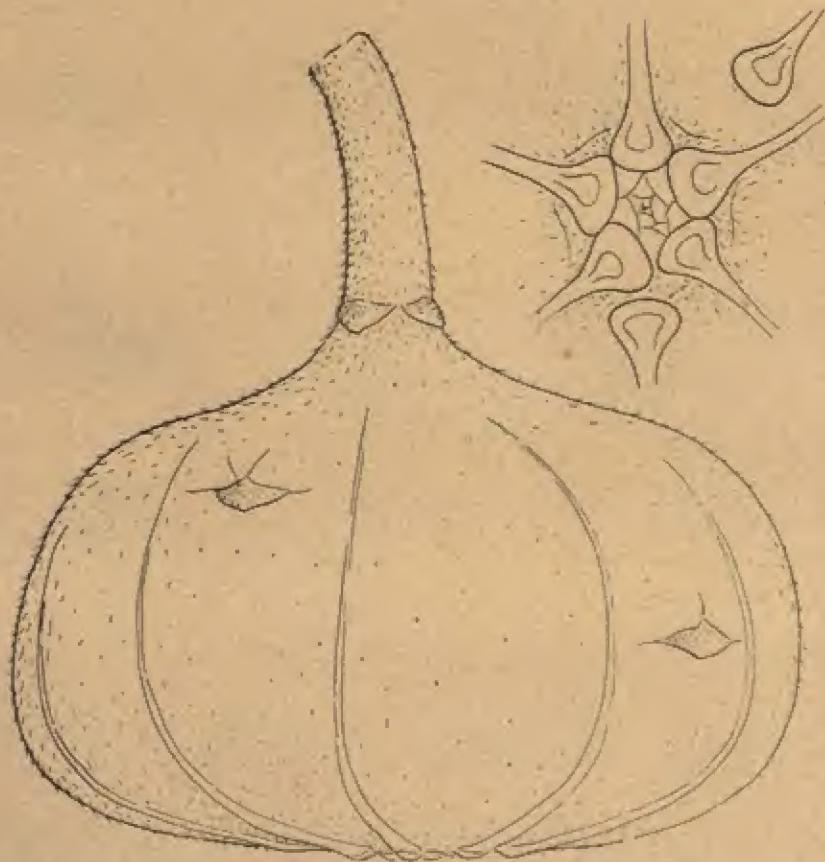
F. hispida L.

Tree up to 40 ft. high.

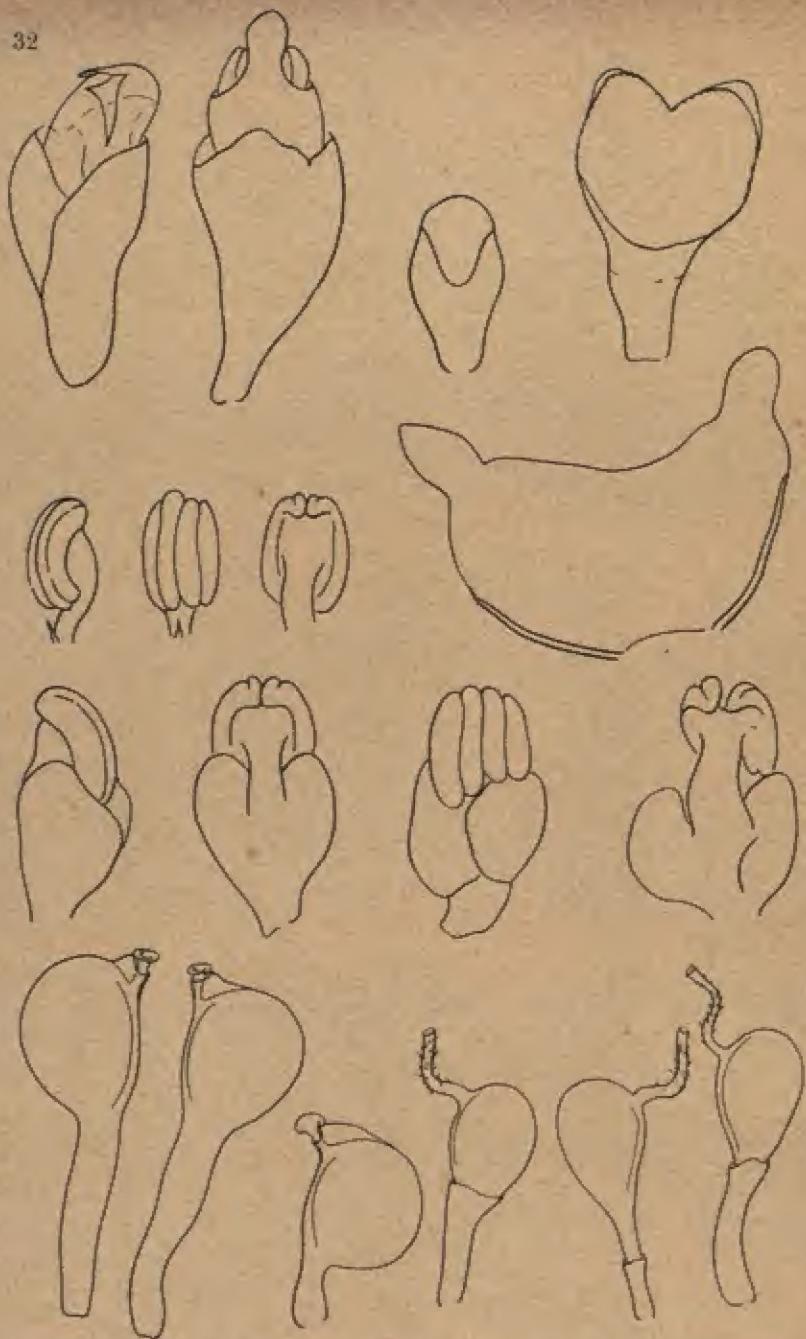
All parts densely hispid with short white, or pale brown, hairs when young; leaves hispid-scabrid on both surfaces with short white bristle-like hairs, denser beneath, especially along the veins.

Leaves opposite, rarely alternate, oblong-elliptic to ovate-elliptic rarely subrhombic, with a short acuminate apex 10—25 mm. long; edge crenate-serrate; blade 7—35 x 2.5—16 cm., with 4—7 pairs of primary veins; secondary veins parallel; base narrowly cordate, equal, with 5—7 veins; petiole 1—10.5 cm. long x 2—4 mm. thick; stipules 11—25 mm. long.

Receptacles mostly caulinorous on leafless hanging twigs arising in clusters from the trunk and main branches, up to 1 m. long, sometimes trailing on the ground or geocarpic at the tips; a few also axillary, singly or in pairs;

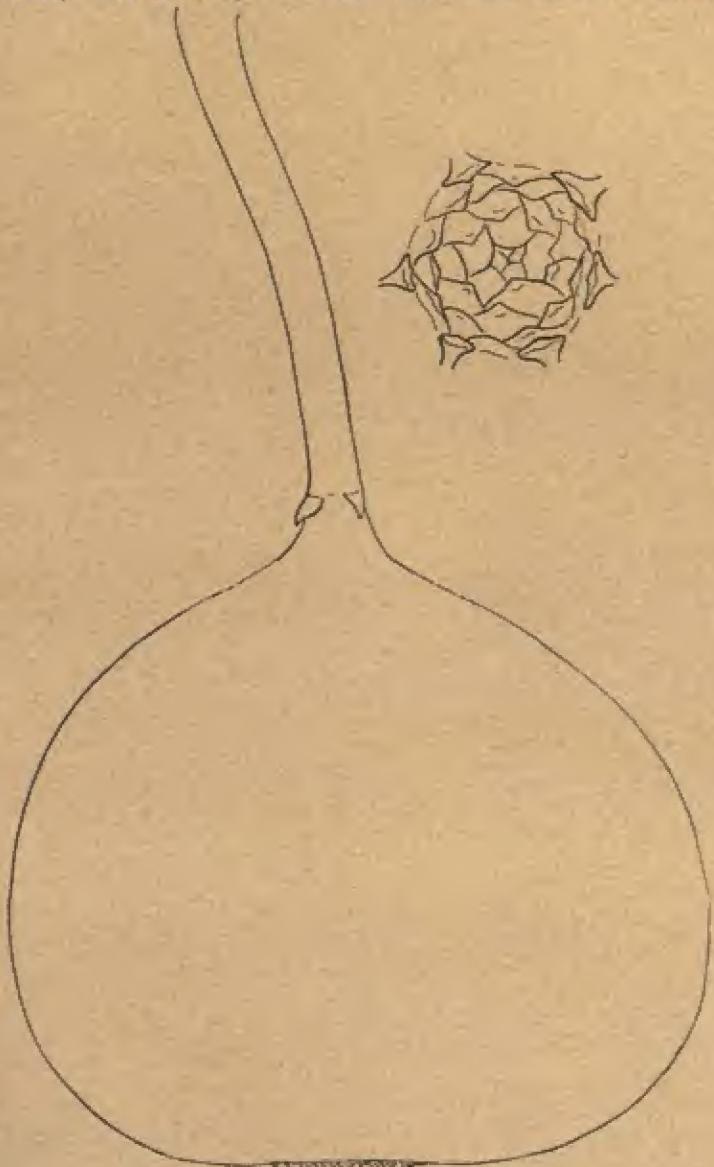


Text-Fig. 16. The receptacle of *F. hispida*, $\times 3$.



Text-Fig. 17. *F. hispida*. From left to right:—top-row, 2 unopen male flowers, an open perianth and an upper bracteole of a male flower; second row, 3 immature stamens, the perianth of a mature male flower cut open; third row, four stamens with hypertrophied filaments (possibly from gall-pricks); bottom-row, 3 mature gall-flowers, 3 mature female flowers; $\times 10$.

shortly stalked, globoso-depressed, flattened distally, with or without a short neck, thinly hispid puberulent, at first light green with 7–9 dark green longitudinal stripes often slightly elevate especially toward the apex, disappearing near the base, ripening pale yellowish green, the body ca. 35 mm. wide \times 25 mm. long; *peduncles* 5–15 \times 2–3 mm.; *basal bracts* 3 in a collar, subtriangular, adpressed, 1–1.5 mm. long \times 2–3 mm. wide; *lateral bracts* few, scattered,



Text-Fig. 18. The receptacle of *F. Miquelii*, \times 3.

adpressed, flat, subtriangular, 2—4 mm. wide; *orifice* slightly depressed, closed by the internal bracts, surrounded by an angular ring of 5—6 triangular-tubercular, *apical bracts*, 1—2.5 mm. wide; *internal bristles* absent.

Female flowers 2.5—4.5 mm. long; *perianth* and *seeds* as in *F. lepicarpa*; *style* hairy, 1.2—1.5 mm. long.

Gall-flowers 2.5—5 mm. long; as in *F. fistulosa*, keel slight.

Male flowers 3.5—4.5 mm. long; as in *F. fistulosa*; *stamen* often with a bristle at the base, the filament often swollen irregularly (? from gall-pricks).

Malay names:—ara singgai (Pekan; S. Raya, Perak); seniah (Kuala Kangsar); daun senil (Telok Anson); ara bumbering (Bentong); ara lempong (Langkawi).

Collections. Gall-plants:—Curtis 3516; Kekall s.n., Selangor 1891; Ridley s.n. Thaiping 1892; Ridley s.n. Kelantan 1889; Ridley s.n. Kedah 1893; Ridley 1304, 2318; Burkhill 877, 981, 1013; S. 10213, 24575. Female plants:—Curtis s.n. Penang 1889; Wray 2397; Ridley s.n. Kelantan 1917; Ridley 8185, 14545; S. 18224, 23132; Strugnell 12809. Receptacles absent or very young:—Kunstler 10584; Curtis s.n. Langkawi 1901; Ridley s.n. Pekan 1889; Burkhill s.n. P. Tinggi, Johore 1915; S. 13394, 14916, 16252, 16470, 16593, 17218.

This species is very common in lowland secondary jungle in the drier parts of the peninsula as in Penang and the north and on the east coast; it does not occur in Singapore. It is easily known vegetatively by the large, oblong, hispid, opposite leaves with long stalks. It appears closer to *F. lepicarpa* than any other of the malayan species in possessing lateral bracts, but in having pedunculate, cauliflorous receptacles on long leafless branches and the narrowly infundibuliform style to the female flower it suggests a distinct group. Large plants, when fruiting, are most striking objects: they are well-figured by Koorders (6).

F. Miquelii King

short, stiff, adpressed brownish hairs; mature parts glabrescent especially the A small tree up to 40 ft. high: bark greyish black, smooth.

Young shoots, except the stipules, and receptacles sparsely covered with internodes, petioles and receptacles; midrib and main veins usually persistently hairy beneath, rarely becoming glabrous; stipules always glabrous.

Leaves alternate, occasionally opposite, obovate elliptic, suddenly contracted into a pronounced subparallel-sided tip, 5—25 mm. long; edge entire, rarely serrulate towards the apex; blade 6—22 x 2—8 cm., with 5—13 pairs of primary veins; base cuneate, equal, with 3 veins; petiole 5—22 x 1.5—2 mm.; stipules 5—15 mm. long, lanceolate, early caducous.

Receptacles borne in dense botryoidal masses up to 40 cm. wide, on leafless branches, up to 34 cm. long x 2 cm. thick at the base, arising singly or in clusters from the trunk and main branches; subglobose, without or with a very short neck, even, not ridged, rapidly glabrescent and soon light brown scurfy from the breaking up of the epidermis, subtubercular from the numerous prominent lenticels, dull greenish olive, ripening russet-brown or bronze, the body 25—28 mm. long x 28—32 mm. wide; peduncles 1—3 cm. x 1.5—2 mm.; basal bracts 3 in a collar, thick, subtriangular, distinct, 1—2 mm. long; lateral bracts none; *orifice* not depressed, closed by numerous small imbricating apical bracts in a prominent rosette, 1—9 mm. wide, the outer bracts with slightly recurved tips and especially prominent in young receptacles, mostly with 3—7 peripheral bracts; *internal bristles* absent.

Female flowers 3.5—6 mm. long; *perianth* very short, 5—1 mm. long, gamophyllous tubular, with scarcely dilated mouth, sheathing the ovary-stalk for half or two-thirds of its length; *style* long, 1.5—1.7 mm. glabrous; *seeds* as in *F. fistulosa* but the keel ill-defined and the sides only minutely rough.

Gall-flowers 2—5 mm. long; perianth as in *F. fistulosa* but without a keel and ending abruptly in a short tube sheathing the base of the style.

Male flowers 2.5—4 mm. long; as in *F. fistulosa*; bracteoles glabrous; stamen 2 mm. long, without a basal bristle.

"Malay names:—ara batu (N. Sembilan), ara katak (Selangor), kelampong (Malacca), kelumpong gajah (N. Sembilan), kundumpong jantan (N. Sembilan), ara lempong, kelumpong bukit.

Collections, Gall-plants:—Alvins 1882; Goodenough 1869; Ridley s.n. B. Timah, Singapore; Ridley 14142; S. 13440, 16860, 17532, 20133, 23771. Female plants:—Alvins 1175; Hullett 448; Ridley 1920, 2327, 3393, 5632, 8188; S. 4422, 9617, 10238, 10669, 14674, 18285, 18822, 19494, 19653, 21798, 25758; C. F. Field No. 4587. Receptacles very young:—Alvins 927; Wray 2668; Symington 22714.



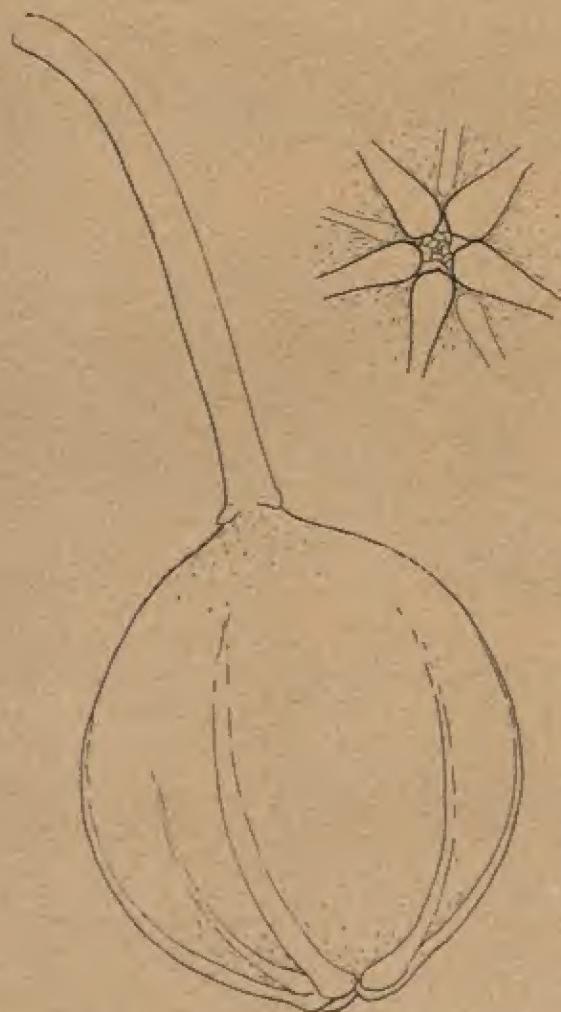
Text-Fig. 19. *F. Miquelianum*. From left to right:—2 mature female flowers, 2 mature gall-flowers, 2 expanded stamens, 2 open male flowers with upper bracteole and perianth; $\times 10$.

This species is common in damp lowland forest, usually in valleys by the streams or on the steeper slopes, not in secondary jungle nor in the open; it still occurs in Singapore on Bukit Timah. King says that the ripe fruits are greenish and that both gall- and female flowers have no perianth, which is incorrect. Winkler (15) noted that the female flowers have a short tubular perianth; it often disintegrates as the receptacles ripen but it is quite obvious in young flowers.

F. Scortechinii King

A small tree up to 30 ft. high; latex white; bark greyish, smooth.

Young shoots, including the stipules, and young receptacles densely covered with short stiff pale brownish to purple brown adpressed hairs; petioles and leafy internodes persistently hairy; leaves persistently hairy on the midrib and main veins on both surfaces and with a few hairs on both side of the blade; receptacles rapidly glabrescent, except near the apex and inside, which are persistently hairy.

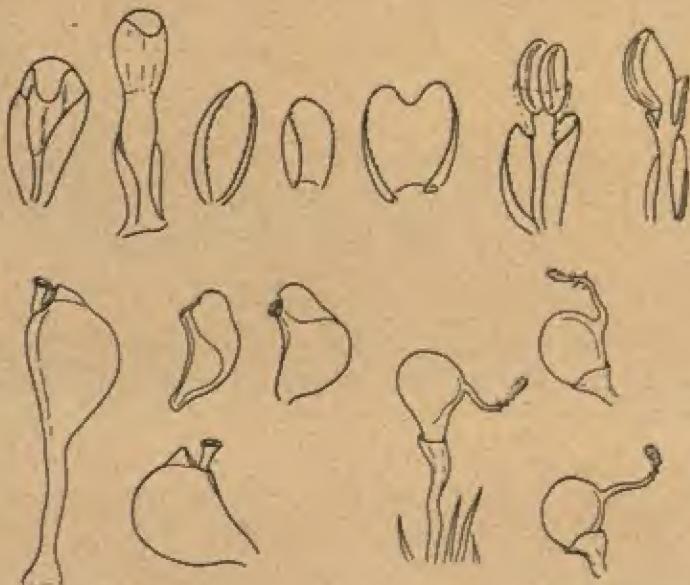


Text-Fig. 20. The receptacle of *F. Scortechinii*, $\times 3$.

Leaves alternate, rarely opposite, narrowly elliptic to obovate-elliptic, more or less suddenly contracted to the tip, 5—25 mm. long, as in *F. Miquelii*; edge entire or serrulate; *blade* 6—28 x 1—8.5 cm., with 5—10 pairs of primary veins; *base* cuneate, often slightly unequal, with 3 veins; *petiole* short, 3—12 x 1.5 mm.; *stipules* lanceolate, 4—11 mm. long, hairy chiefly on the outside at the base and on the keel, long persistent, subtending the mature leaves.

Receptacles borne on tubercles or short leafless branches up to 8 cm. long, grouped in dense pulvinate clusters up to 10 cm. wide, with 6—70 receptacles in a cluster, on the trunk and main branches, the old fruiting branches occasionally lealy at the tip and up to 15 cm. long; ovoid, with or without a short neck, with 5 distinct blunt low ridges in the distal half each terminating in an obtuse umbonate apical bract round the orifice, often with faint intervening ridges, bright green ripening pale yellow (or red?), the body 20—25 x 18—20 mm.; *peduncle* 5—3 cm. x 1.5—2.5 mm.; *basal bracts* 3 in a collar, acute, triangular, 1 mm. long, rarely one displaced up the body; *lateral bracts* absent; *orifice* sunken, at first obscured by the convergent ridges and appearing pucker'd, becoming 2—3 mm. wide, closed by numerous small tumid umbonate internal bracts; *internal bristles* numerous, short, up to 1 mm. long, brown.

Female flowers 2.5—3.5 mm. long; *perianth* .5—.7 mm. long, gamophyllous, entire, sheathing the ovary-stalk and forming a cup round the lower third of the ovary; *style* 1 mm. long, with a few short stiff patent hairs just below the stigma; *seeds* as in *F. Miquelii*.



Text-Fig. 21. *F. Scortechinii*. From left to right:—*above*, a subsessile and a pedicillate male flower with upper bracteole and perianth, 3 upper bracteoles, an open male flower with the perianth removed, an open male flower in section showing the upper bracteole, pedicel, perianth and stamen; *below*, 2 mature and 2 immature gall-flowers, 3 mature female flowers with internal bristles; x 10.

Gall-flowers 2–4 mm. long; as in *F. fistulosa*, with a prominent keel.

Male flowers 2–3 mm. long; as in *F. fistulosa*; the upper bracteole entire or shortly bilobed, the pedicel well developed and the perianth soon free; *stamen* without a bristle.

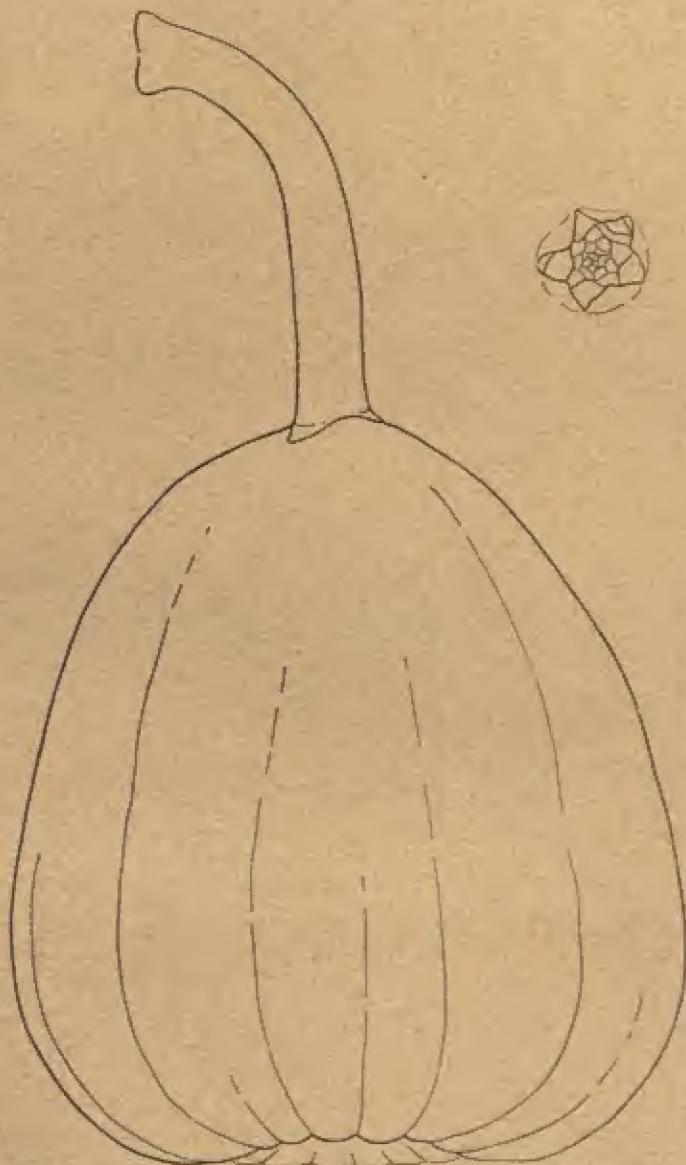
Malay names:—kelampung ketchil (Malacca).

Collections. Gall-plants:—Kunstler 10196; Perak 3187 (? Wray); Curtis 1749; Guedenough 1945; Ridley 5631, 11035, S. 2851, 6578, 10816, 21905, 25831. Female plants:—Curtis s.n. Dindings, 1902; Curtis 1749, 1889; Wray 3564; Ridley s.n. Penang 1900; Ridley s.n. B. Timah, Singapore 1907; Ridley s.n. G. Pulai, Johore s.n. 1892; Ridley 7207, 7627; Symington 24153; Burkhill 954, 3546; S. 10262, 10496, 11599, 19981, 17471.

This species grows with *F. Miquellii* in the forest, not in the open, and appears to be as abundant, though less conspicuous on account of the smaller fig-clusters. Both species have been mixed in the herbarium and several of the collections quoted will be found under *F. polysyce* and *F. staphylosyce*. In vegetative characters *F. Miquellii* and *F. Scortechnii* are very close but *F. Scortechnii* can always be distinguished by the better developed pubescence, the persistently hairy petioles and the persistent stipules: S. 10816 and 17471 have many more or less patent hairs and in this respect approach *F. chamaecarpa* and *F. obpyramidata*. They also differ distinctly in the characters of the receptacle and the flowers, though they are certainly close allies. The receptacular clusters in *F. Scortechnii* are always compact and pulvinate with much shorter fruiting branches, the receptacles being compressed and angular; those of *F. Miquellii* soon pass through the pulvinate stage and develop longer fruiting branches, as a further step towards the geocarpic habit. The receptacles of *F. Scortechnii* are ellipsoid and deeply plicate or ridged at the apex and with a sunken orifice; those of *F. Miquellii* are subglobose, without ridges, and with a large rosette of apical bracts, the orifice not being sunken. But these differences may not be easy to determine in dried specimens, especially if the receptacles are young in which case the apical ridges of *F. Scortechnii* will scarcely be visible. Then one can check identification from the flowers. In the case of gall-plants, the perianth of the gall-flower has a prominent keel in *F. Scortechnii* and none in *F. Miquellii*: in the case of the female plants, the style is pubescent in *F. Scortechnii* and glabrous in *F. Miquellii* and the perianth is much larger in *F. Scortechnii* than in *F. Miquellii*. Moreover the internal bristles in *F. Scortechnii* are absent from *F. Miquellii*. Living plants, with receptacles, can be told at a glance not merely from the shape of the fruiting-clusters but from the colour of the receptacles: in *F. Miquellii* they are dull green and soon become dull russet-brown, while in *F. Scortechnii* they are light apple-green becoming clear pale yellow, though the colour when ripe is uncertain: I found that they ripened pale yellow in a gall-plant in Kemaman and other collectors give reddish green, red and dull crimson in their field-notes, which seems mistaken for this group of *Covellia*.

I do not think that the differences between the two species have hitherto been understood, and hence their confusion. King

knew only one collection, Kunstler 934, at the time of writing his monograph, and though I have not seen that collection, there can be no doubt from his description of the identity of the subsequent ones from Malaya: the male and gall-flowers have not been described



Text-Fig. 22. The receptacle of *F. obpyramidata*, $\times 2$.

previously, and it has not been found outside Malaya. In the construction of the fruiting-clusters and the perianth of the female flowers, *F. Scortechinii* is the less advanced; to its other characters only a specific value can be assigned but they are pronounced enough to suggest several allied species at the same phyletic level. The resemblance to *F. chamaecarpa* in pubescence, in construction of the receptacle and in the female flowers is worth recalling as it may prove a true relationship.

F. obpyramidata King

A small tree up to 50 ft. high with hollow twigs and greyish brown bark.

Stems, petioles, backs of the stipules and the young receptacles densely hispid from short stiff brownish or purple-brown adpressed and patent hairs, up to 1.5 mm. long; leaves with similar hairs on the midrib and main veins of both surfaces when young, and with smaller whitish hairs adpressed on both sides of the blade; all parts glabrescent when adult, the blade generally remaining distinctly hairy.

Leaves alternate or opposite, large, obovate, more or less distinctly rhombic, often slightly inequilateral, tapered rather suddenly to a shortly acuminate tip up to 8 mm. long; edge subserrate or subcrenate toward the apex, sometimes entire, often coarsely and distantly serrate in young plants; blade 8—33 x 3.5—17 cm., with 5—10 pairs of primary veins; secondary veins transverse, parallel; base distinctly cordate, often slightly unequal, with 5—7 veins, one pair often minute; petiole 1—8 cm. x 2.5—3.5 mm.; stipules soon caducous, adpressedly hairy, 10—22 mm. long.

Receptacles borne as in *F. Miquelianii*; leafless fruiting branches up to 14 cm. long (? longer on old plants); fruiting clusters up to 40 cm. wide; obconic, truncate at the apex, without or with a short neck up to 5 mm. long, with 12—15 faint longitudinal ridges strongest at the apex and disappearing below the middle, soon glabrous then slightly brown scurfy, verrucose with conspicuous lenticels, at first green with the lenticels paler, ripening yellow to dingy brownish ochre, the body 3.5—4.8 cm. long x 3.4—4.6 cm. wide; peduncle 1.2—3.6 cm. x 2.5—4 mm., slightly dilated upwards, soon scurfy; basal bracts 3 in a collar, broadly triangular, 2—3 mm. long; lateral bracts absent; orifice deeply depressed, closed by numerous small internal bracts with 5 larger peripheral apical bracts, forming a disc 6—8 mm. wide; internal bristles numerous, up to 1 mm. long.

Female flowers 3—4 mm. long; perianth 2—5 mm. long, gamophyllous, entire, tubular, sheathing the ovary-stalk and ending abruptly at the base of the ovary; style 1—1.5 mm. long, with a few hairs as in *F. Scortechinii*; seeds as in *F. Miquelianii*.

Gall-flowers 3—5 mm. long, as in *F. fistulosa* but the perianth without a keel and sometimes covering only the lower half or quarter of the ovary, with an entire truncate edge.

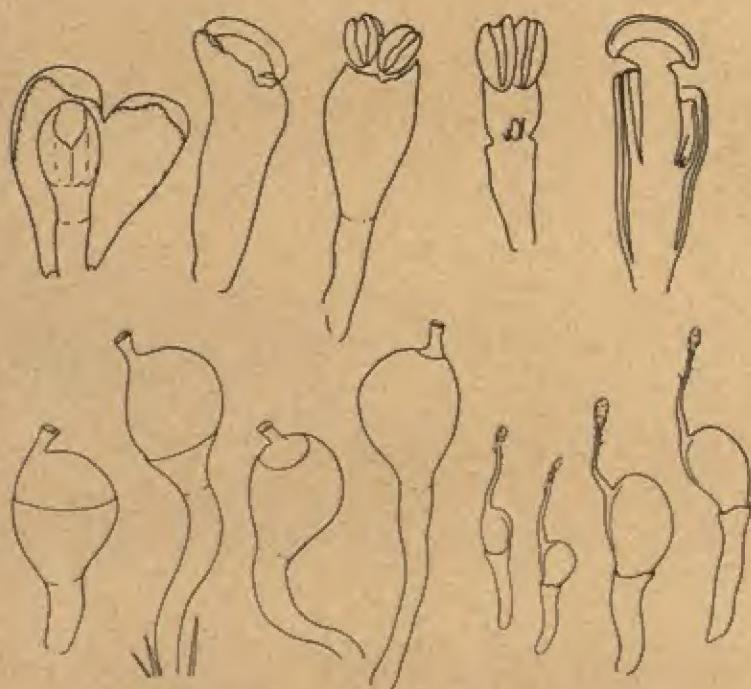
Male flowers 3—3.5 mm. long, as in *F. fistulosa*; stamen one, 2—2.5 mm. long, with 1—2 bristles at the base and often a conical rudiment also.

Malay names:—kelepong (Kuala Pilah, N.S.), kelempong (Kota Tinggi, Johore), ara lempong (Perak).

Collections. Gall-plants:—Ridley 7629, 14556; S. 10353, 13847, 19630, 22046, 22594, 25843, 25997. Female plants:—Fielding s.n. Tengarah, Johore, 1892; Ridley s.n. Tembeling, 1891; Ridley s.n. Labu River, Selangor 1896; Strugnell 13606. Sterile:—Burkill 13787.

This species, like *F. lepicarpa*, occurs in the virgin forest scattered only along riversides in the lowland. But where the banks are damaged or deforested it increases enormously and becomes one of the characteristic and abundant plants. It is exceedingly

common in Malacca and Negri Sembilan by the streams and rivers which course through the rice-fields; and in Trengganu, on the banks of the Kemaman from where the true *neram*-forest begins up above the wide flood-damaged stretch and the straggling villages to where the river becomes distinctly tidal—from Ayer *puteh* on the tributary, S. Nipah, to S. Pinang hilir—it forms great thickets and even pure stands of many yards length, and the large figs fall off and float downstream. But on the Sedili, in Johore, in contrast, the banks of which are still clothed with virgin forest, it is scarce, and obtains a foothold only where a tree has fallen or where the axe has locally been busy, as on its tributary the Dohol. It is probably as much distributed by water as by animals. The figs



Text-Fig. 23. *F. obpyramidata*. From left to right:—above, an unopen male flower with the upper bracteole unfolded showing the pedicel and perianth, 4 open male flowers, (one with the bracteole and perianth removed, another in section); below, 4 mature gall-flowers, with internal bristles, 2 mature and 2 immature female flowers, $\times 10$.

are edible with a slightly nutty flavour when unripe, though very gummy; perhaps the ripe female figs are tasty, since the malays eat them, but the ripe gall-figs are crawling with insects.

F. obpyramidata has been considered endemic to Malaya and *F. nota* to the Philippines (8), but I am sure that they are the same species. Merrill's description and Elmer's field-notes apply exactly to the malayan plant, only I find in the dried material from the Philippines in the Singapore herbarium that the perianth of the gall-flowers is generally tubular and sheathing just the ovary-stalk or covering but the lower quarter or third, rarely two-thirds, of the ovary; the perianth, is further reduced, that is to say, than in the malayan plants and approaches the condition in the female flowers. Such a difference, even if it is a geographic constant, is scarcely specific. The binomial, *F. nota* (Blanco) Merr., dates from 1904, and King's from 1888, so that *F. obpyramidata* is the valid name.

The specimens in the Singapore herbarium have been mixed with *F. pomifera*, to which, as I shall show, it is closely allied, and Burkill 13847 was referred to *F. variegata* by Ridley as the first record of that species in Malaya. It is certainly close to *F. Miquelii* and appears to be at a phyletic level between it and *F. Scortechinii*, at least as regards the development of the fruiting branches and the perianth, but it is at once distinguished by the broad leaves with cordate base, the long petioles and the deeply umbilicate receptacles. In hairiness it varies greatly; the hairs are typically bristle-like, dark coloured, patent and crowded, but in some collections they are short and more or less adpressed as in *F. Scortechinii*, and occasionally the parts are nearly as glabrous as in *F. Miquelii*. The receptacles appear the largest in Covellia with the most advanced type of body arching far beyond the morphological apex.

F. fasciculata King Hook. F.B.I. 1890, 5, 524.

This species was based by King on a collection of Kunstler's from the Kampar River, Perak, and it has not been found since. There is no specimen in the Singapore herbarium. From King's description it might be considered a specimen of an old plant of *F. obpyramidata* the leaves of which on the ultimate shoots are small with a narrow, scarcely cordate base. Ridley's description (12) of the same specimen differs considerably from King's in ascribing to it 9—10 pairs of primary veins, instead of 4—5, and hairy, not glabrous, receptacles; he wrongly attributes the species to Hooker.

F. polysyce Ridley Jo. Roy. As. Soc. S. Br. 1920, 82, 195.

This species comprises many figs indeed. It is a synonym *pro parte* of *F. fistulosa*, *F. Miquelii*, *F. Scortechinii* and *F. variegata*. No type-specimen was cited and the named collections—13 in all—

which can be referred to in Singapore belong to these species. The first numbered collection after the original description, namely Ridley 11035, is *F. Scortechinii* so that it would be simpler to refer *F. polysyce* as a synonym of *F. Scortechinii*, if the description and illustration given by Ridley permitted. I dissect it as follows.

The original description applies mainly to *F. fistulosa*. The illustration—fig. 156 in Ridley's Flora—is *F. variegata*; the cordate leaves with parallel secondary veins, the bistamine male flower and the partite perianth of the female flower are clearly shown. The collections cited after the original description are as follows:—

F. fistulosa:—Ridley 1175.
F. Miquelii:—Alvins 927 (Bukit Klan); Captley 1882 (Bukit Sulu); Wray 2668.

F. Scortechinii:—Johore, G. Pulai, leg. 1892; Goodenough 1945 (Tampin Hill); Kunstler 10196; Curtis 1889 (Penang); Curtis 1749 (Langkawi); Ridley 7207, 7627, 11035.

The 'very common and conspicuous tree' which Ridley had in mind is certainly *F. variegata*. S. 10497, from Sumatra, which Ridley subsequently referred to *F. polysyce*, is probably *F. d'Albertisii*. The collection of *F. polysyce* which, according to Ridley, King confused with *F. Miquelii* must be Kunstler's 10196, which is *F. Scortechinii*.

F. staphylosyce Ridley Flora Mal. Pen. Suppl. vol. 5, 334.

This is *F. Scortechinii*. I have examined Burkhill's 11599 at Singapore, which is the only collection cited by Ridley and therefore the type. S. 10497, from Sumatra, referred also *F. staphylosyce* at Singapore, is also *F. Scortechinii*. Both collections have female receptacles.

Neomorphe.

The Receptacle. In the malayan species the receptacles are pedunculate with a collar of three basal bracts and without lateral bracts, essentially as in *F. fistulosa*, and they are caulinorous as in *F. obpyramidata*. They ripen rose-red in *F. glomerata*, *F. variegata* and *F. pomifera*, and green in *F. viridicarpa*.

The Flowers. The construction is essentially the same as in Covellia. Neuter flowers occur in a single ring round the orifice of the female receptacle and the species are dioecious, excepting *F. glomerata* which is peculiarly monoecious. But on the details of the flowers the species fall into three groups; *F. pomifera* agrees with Covellia; *F. variegata* and *F. viridicarpa* form a second group and *F. glomerata* the third, both with certain very distinctive features.

In *F. pomifera* all three kinds of flower are potentially stalked. In *F. variegata* and *F. viridicarpa* they are sessile. In *F. glomerata* the gall-flowers are stalked, the male and female flowers sessile.

The perianth of the gall- and female flowers in *F. pomifera* is an entire gamophyllous sack which completely covers the ovary except for the apical pore through which the style projects, as in the gall-flowers of *F. fistulosa*; there is no keel. In *F. variegata* and *F. viridicarpa* the perianth of the gall- and female flowers is partite with 2—4, generally 3, lanceolate or spatulate segments shortly gamophyllous at the base, like that of *F. cunia* only with fewer segments. *F. glomerata* agrees with *F. variegata* but the segments are irregularly dentate and the gamophyllous portion is better developed, forming a third or a half of the whole.

The styles of the gall- and female flowers in *F. pomifera* are as in *Covellia*. In *F. variegata* and *F. viridicarpa* the styles of both flowers are very alike, being short with a thick, conical coarsely papillate, not infundibuliform stigma, which is longer in the female flower. In *F. glomerata* the styles are distinctly dimorphic but in a different manner from *Covellia*: that of the female flower is long and slender with a small, almost smooth, slightly expanded and flattened stigma: that of the gall-flower is much shorter with a thick, clavate, obconic, and distinctly papillate stigma; but in the transitional flowers, which will be described shortly, the style has an intermediate character.

The male flower in *F. pomifera* agrees with that of *F. fistulosa* but has 2, rarely 1 or 3, stamens, arranged in opposition—anther to anther—and without bristles at the base. In *F. variegata* and *F. viridicarpa* the male flowers, though of the same general construction, are very strongly flattened—almost leaf-like—in a plane parallel with a radius from the orifice; they are sessile on a broad base with the two bracteoles alike, being quadrilateral or subrectangular; they also contain 2, sometimes 1 or 3, stamens opposed and without bristles, and they are arranged in irregular circles, two in *F. variegata* and several in *F. viridicarpa*. The bracteoles are attached by the broad base and they overlap with slightly incurved edges at one or both ends, as shown in Text-Fig. 26. The perianth is sessile with two more or less distinct lobes which are deflexed in the bud as in *Covellia*. *F. glomerata* agrees with *F. variegata* but the bracteoles and perianth-segments are irregularly dentate and rather strongly hooded in the bud; the filaments of the stamens moreover are connate for a quarter to two-thirds of their length from the base and at the point of divergence there is generally a small abortive ovary and style.

In *F. variegata* the male flower occasionally has beside the stamens a small abortive ovary with rudimentary style, and, similarly, the neuter flowers in the female receptacles often contain a small abortive ovary and stamen, rarely one fertile, though undersized, stamen with another sterile stamen and ovary; but I have not seen a neuter flower with two fertile stamens. In *F. viridicarpa* I have not seen such variations in the true male flowers or in the neuter flowers but, occasionally, scattered over the sides of the

receptacle among the gall-flowers, are male flowers with a tripartite perianth, as in the gall-flowers, and containing a fertile stamen and an abortive ovary.

F. glomerata is monoecious with all three kinds of flower in the same receptacle. The male flowers, as shown in Text-Fig. 30, are arranged in two to three irregular circles round the orifice. The gall-flowers are crowded over the rest of the interior with the female flowers between the bases of their stalks, and, at an intermediate level, occur the transitional flowers. These have the appearance of shortly stalked gall-flowers with a long style, as shown in Text-Fig. 32, and the taller ones tend to be true gall-flowers, the shorter to be female flowers; they contain gall-wasps (or their inquilines) or seeds; and occasionally a sessile flower, which is morphologically a female, contains a gall-wasp and a stalked flower, morphologically a gall-flower, contains a seed. The dimorphism is thus bridged. In the young receptacles the styles of all the flowers reach to a common stigmatic level. In view of the discrimination of the gall-wasps in oviposition, the structural and functional intermediacy of these transitional flowers and the occasional galling of the female flowers, the pollination and floral physiology of this species must be full of interest. The other monoecious figs with bistamine male flowers are *F. acidula* (Neomorphe), *F. lepidasa*, *F. nemoralis* and *F. Thwaitesii* (Eusyce), and the american subgenus *Pharmacosyce*, which is related to Urostigma and without immediate affinity with the asiatic species. Those of Eusyce do not appear closely allied with *F. glomerata*, but *F. acidula* is very near differing principally in leaf-characters, and it occurs in Borneo. Presumably these two are secondarily monoecious, and they can hardly be closely allied with the rest of Neomorphe. The reunion of the sexes reaches also into the male flowers, the abortive ovary of which is unusually conspicuous.

The Seeds. In all the species the seeds are alike, about 1 mm. long, slightly compressed and with a faint keel and faintly granular, nearly smooth, sides, very much as in *F. Miquelii* or *F. cunia*.

The Leaves. In all, except *F. glomerata*, the leaves are ovate with a broad rounded-cuneate or subcordate base with 5—7 basal veins and parallel secondary veins, as in the broad-leaved species of *Covellia*. In *F. glomerata* they tend to be narrowly obovate with a cuneate, 3-veined base and irregularly transverse secondary veins. They are subcoriaceous in *F. glomerata* and *F. pomifera*.

The Habit. *F. pomifera*, like the species of *Covellia*, is a small spreading tree up to 40 ft. high; so is *F. glomerata*. But *F. variegata* and *F. viridicarpa* are large trees up to 80 ft. high, and *F. variegata* always develops the prominent thin buttresses which are well-shown in Koorders' illustrations; in *F. viridicarpa* they are inconspicuous or absent. And these two are our most striking cauliflorous species. When in fruit, the columnar trunks and massive branches are plastered with the grape-like bunches of receptacles,

which sometimes conceal the bark for considerable stretches; in *F. variegata* they begin a few feet above the ground and the uppermost are sixty to seventy feet above in the crown.

Conclusion.

F. pomifera is allied with certain species of Covellia, as *F. obpyramidata*, rather than with the other malayan species of Neomorphe, which, as defined by King, is unnatural. It contains at least two groups, one of which must be subdivided. The immediate affinity of the malayan species is shown in the following classification:—

- Group 1.* Essentially as in Covellia; with the habit of a small tree; male, gall- and female flowers generally stalked; gall- and female flowers with a gamophyllous sack-like perianth and distinctly dimorphic styles, that of the gall-flower being shortly and widely infundibuliform with a smooth stigma, that of the female flower long and slender with a minutely papillate subclavate stigma; male flowers not flattened, with a tubular bilobed perianth and concave hooded bracteoles, the lower one often absent. *F. pomifera*
- Group 2.* Male and female flowers sessile, with a perianth of 2—4, generally 3, segments arising from a short gamophyllous cup; stigma of the gall-flower never infundibuliform; male flowers strongly flattened.

Subdivision 1.

Diocious with the habit of large trees; gall-flowers sessile; perianth with entire segments, and in the gall- and female flower very shortly gamophyllous; styles of the gall- and female flowers scarcely dimorphic, short, with a thick, conical, coarsely papillate stigma; neuter flowers present. *F. variegata*, *F. viridicarpa*

Subdivision 2.

Monococious with all three kinds of flower in the same receptacle; with the habit of a small, spreading tree; gall-flowers stalked; perianth with irregularly dentate segments, and in the gall- and female flowers gamophyllous for about half its length; styles of the gall- and female flowers distinctly dimorphic, that of the female flower long and slender with an almost smooth, subclavate, often flattened stigma, that of the gall-flower shorter with a distinctly papillate, clavate, obconic, stigma; with transitional gall-female flowers and no neuter flowers. *F. glomerata*

In having two stamens in the male flower, both groups are less evolved than Covellia, and the *F. variegata*-subdivision appears the less evolved of the two in the similar style and well-developed partite perianth in both gall- and female flowers, as well as in the tendency to develop bisexual flowers in both kinds of receptacle. But *F. pomifera* is also less evolved than Covellia in respect of the large perianth in the female flower. How the species are truly related will be clearer when those of neighbouring countries have been worked out and compared with the african Sycomorus.

SPECIFIC NOTES.

F. pomifera Wall.

A small tree up to 40 ft. high, with greyish white bark.

Typically glabrous, often with a few minute bristles at the nodes and the young shoots minutely puberulous.



Text-Fig. 24. *F. pomifera*. From left to right:—*top row*, an unopen full-grown male flower, a basal bracteole, an unopen male flower with the bracteoles removed, an upper bracteole; *second row*, a unistaminate and a bistaminate male flower, (the perianth in section), a bistaminate male flower (the perianth removed), a bistaminate and a tristaminate male flower (the perianth in section); *bottom row*, 3 mature and 2 immature gall-flowers, 2 immature and 2 mature female flowers; $\times 10$.

Leaves alternate, subcoriaceous, ovate or elliptic, with a rather gradually attenuate tip up to 12 mm. long; *edge* distantly and coarsely serrate or shortly and irregularly inciso-dentate; *blade* 16—30 x 7—19.5 cm., with 4—7 pairs of primary veins; *base* widely rounded-cuneate to subcordate, with 5—7 veins; *petiole* 3—12 cm. long; becoming brown scurfy; *stipules* 15—30 mm. long.

Receptacles caudillous as in *F. obpyramidata*; fruiting branches up to 4 cm. long; very massive, pyriform, deeply depressed at the apex, glabrous, slightly longitudinally ridged at the apex, ripening reddish pink with pale green spots, the body 3.5—4.5 cm. wide, neck 3—12 mm. long; *peduncle* 2—3 cm. long; *basal bracts* 3 in a collar, short, obtuse, adpressed, 2—3 mm. long and wide; *lateral bracts* absent; *orifice*, deeply depressed, closed by numerous small internal bracts, with 5—6 larger peripheral apical bracts; *internal bristles* short, white sparse.

Female flowers 2.5—3.5 mm. long; subsessile or stalked; *perianth* 2—3 mm. long, entire, gamophyllous, saccate, covering the ovary to the base of the style, without a keel; *style* 1.5—2.5 mm. long, glabrous, slender, with a long, subclavate stigma; *seeds* as in *F. Miquelianii*.

Gall-flowers 3—5 mm. long, subsessile to long-stalked; *perianth* as in the female flowers; *style* 5 mm. long, shortly infundibuliform with a discoid umbilicate stigma.

Male flowers 2.5—3.7 mm. long, stalked, not compressed; *lower bracteole* entire, obovate; *upper bracteole* bilobed, imbricate, enfolding the perianth, with ciliolate edge; *perianth* 1.5 mm. long, gamophyllous, cupular, with one deflexed lobe, edge ciliolate; *stamens* 2.5—4 mm. long, rarely 1 or 3, anthers opposed, 1—1.5 mm. long, filaments often connate at the base, without bristles.

Collections. Gall-plants:—Wray 3718; Ridley s.n. Telom, Pahang 1900; Ridley 2320; S. 11942, 21227. Female plants:—Wray 3601; S. 15144.

This species appears to grow in secondary jungle and in the absence of fruits might be mistaken for the common *F. variegata*. But the resemblance between the two, as already noticed, is largely superficial: *F. pomifera* should easily be distinguished by the white bark, absence of large buttresses, firmer coarsely dentate leaves with a rounded cuneate base (only the leaves of young plants of *F. variegata* are dentate), and the much larger receptacles. It is however closely related to *F. obpyramidata*; the receptacles have identically the same form and construction and the floral differences require a microscopic examination to be determined: but *F. pomifera* is typically glabrous, with the leaves firmer, never truly cordate, with fewer primary veins and with a coarsely dentate edge. The colour of the ripe receptacle may also be distinctive: Wray and Ridley give it in their field-notes as red or pink with pale green spots: Foxworthy and Nur (S. 11942) give it as whitish: yet, if, as it seems, this species is so close to *F. obpyramidata* one would expect it to be yellowish. Several sheets of *F. obpyramidata* have been referred to *F. pomifera* in the Singapore herbarium.

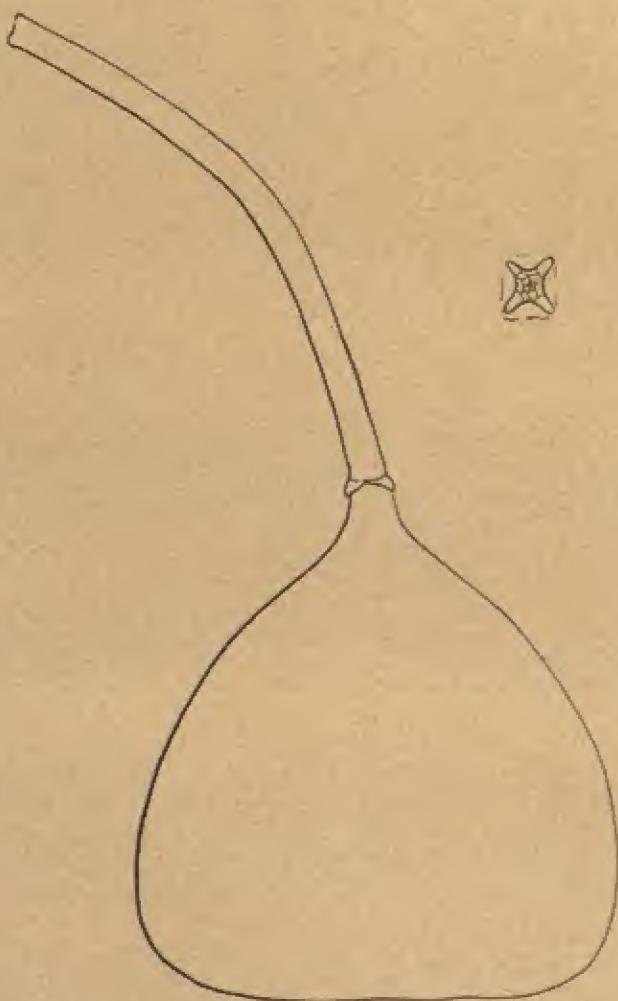
F. variegata Bl.

Tree up to 80 ft. high with prominent slender buttresses and smooth pinkish brown bark; latex copious, white.

Wholly glabrous or with the young parts finely pubescent with minute erect downy white hairs and the mature parts glabrescent.

Leaves alternate, mesophytic, ovate or cordate, gradually or suddenly contracted to a short tip up to 14 mm. long; edge entire (generally coarsely and irregularly serrate towards the apex in young plants); blade 8—33 x 5—15 cm., with 4—8 pairs of primary veins, generally 3—6, making an acute angle with the midrib; base distinctly but not deeply cordate, rarely simply rounded, with 5 veins; petiole 2—14 cm. x 2—4 mm. becoming thinly brown scurfy; stipules 6—18 mm. long.

Receptacles cauliflorous, on tubercles or short leafless woody branches up to 7 cm. long, arranged in large clusters on the stem and main branches, the lowest clusters 2—8 ft. from the ground; pyriform, often subtruncate at the apex, smooth, glabrous, light green ripening rose-red with 8—11 faint darker longitudinal stripes and scattered pale spots (lenticels), the body 2.5—



Text-Fig. 25. The receptacle of *F. variegata*, x 2.

3.5 cm. long and wide, neck 0—5 mm. long; wall 4—6 mm. thick; peduncle 1.5—6 cm. x 2—3 mm.; basal bracts 3 in a collar, small, triangular, 1—1.5 mm. long; lateral bracts absent; orifice slightly depressed, closed by numerous small internal bracts, with 4, rarely 3 or 5, larger peripheral apical bracts; internal bristles absent; internal bracts and perianth crimson.

Female flowers 2.5—3.5 mm. long, shortly stalked; perianth of 3—4, rarely 2, lanceolate, spatulate or irregularly ligulate, blunt, glabrous segments shortly gamophyllous at the base; style 1—1.3 mm. long, lateral, thick, clavate, with a coarsely papillate, conical, whitish stigma 5 mm. long; seed yellow slightly compressed, with a faint keel and faintly granular, nearly smooth sides.

Gall-flowers 2.5—3 mm. long, shortly stalked, with the perianth, style and stigma as in the female flowers; the stigma shorter, 6—8 mm. long.

Male flowers in two irregular rows; 2 mm. long, sessile, strongly flattened, leaf-like; bracteoles quadrilateral to semicircular, entire, obtuse, glabrous, with a broad base, closely applied and shortly imbricating at the ends, rarely the upper bracteole slightly gamophyllous; perianth 2—2.5 mm. long, gamophyllous, deeply cupular (the cup 1.5—1.7 mm. high), often incised, sometimes nearly to the base on one side, and with 1—2 short lobes deflexed in the bud; stamens 1.5—2 mm. long, mostly 2, generally unequal, one sometimes abortive, rarely one or three or with an abortive ovary; without bristles.

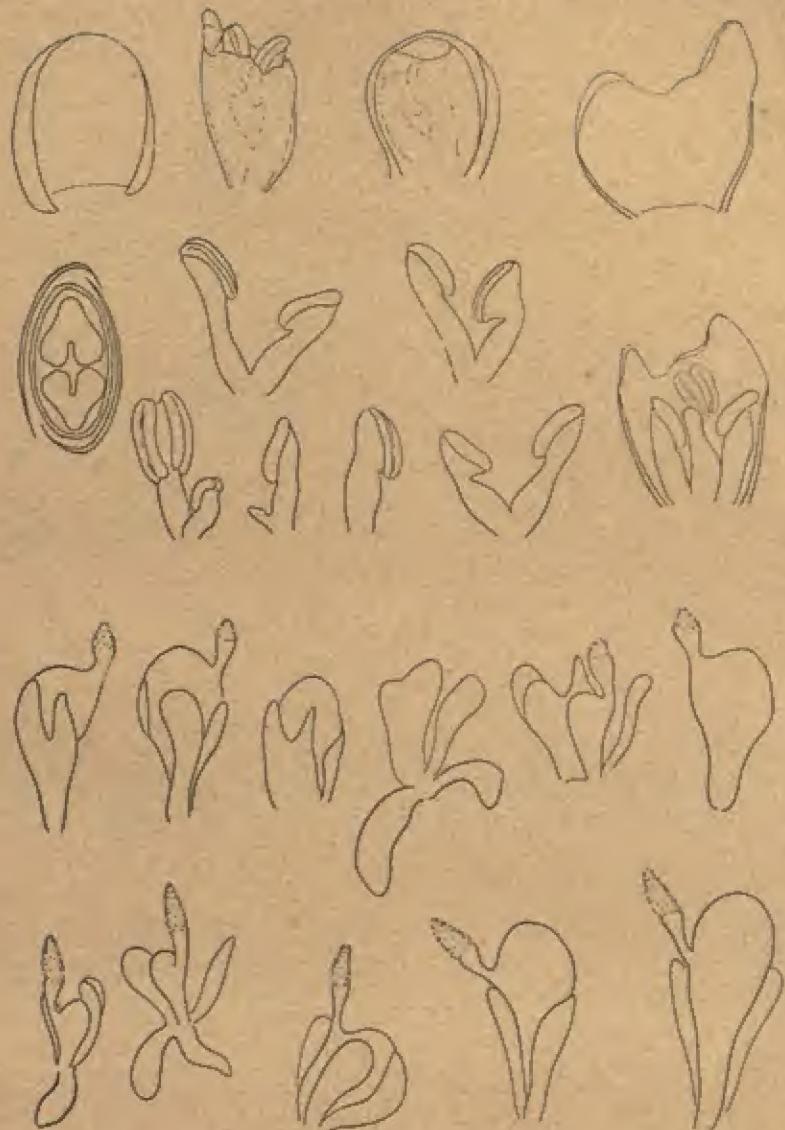
Neuter flowers in one circle, as in the male flowers but smaller, often with a rudimentary ovary and style and an abortive stamen, sometimes with a fertile, undersized stamen, rarely one fertile and one abortive.

Malay names:—kelumpong, kelepong (Singapore, Johore, N. Sembilan).

Collections. Gall-plants:—Curtis 3519; S. 9838, 10062, 21178. Female plants:—Curtis 3521; Ridley s.n. Chan Chu Kan, Singapore, 1890; Ridley s.n. P. Ubin, Singapore, 1900; Burkill 949, 1908, 4409; S. 21179.

This is perhaps the commonest large fig-tree in Malaya. It occurs plentifully in secondary jungle, in waste places along roadsides and in gardens, but that it is also a true inhabitant of the forest is, I think, certain from the way it grows on the passes of the main range and in the forest reserves round Kuala Pilah and Bentong: it does not occur in the mountains above 3000 ft. It is a common and very widely distributed species in the east, extending from Assam to the Philippines and from Hongkong to Java. The early collections of this species from the peninsula were referred by Ridley to *F. polysyce* and Ridley's record of *F. variegata* (Flor. Mal. Pen. vol. 5), as already mentioned is incorrect; it is based on Burkill's 13847 which is *F. obpyramidalis*; and this is the first record of species, therefore, in Malaya. Five collections (Curtis 3519, 3521; Ridley P. Ubin; Burkill 4409; S. 9838) were referred by Ridley to *F. laevis*, which is a climber of the subgenus Eusyce with solitary axillary receptacles containing numerous chaffy internal bristles, although the leaves and the shape of the receptacles are certainly very similar. I do not understand how *F. tenimbrensis* Moore can differ from *F. variegata*, although the author says that the flowers are different (10).

I have watched the fruiting and leafing of 4 female plants and 3 gall-plants in Singapore during the same time as those of *F. fistulosa*; three female plants bore one crop and one of them had two, while the gall-plants had 1—3 crops. The period of development and ripening of the female receptacles from inception



F. variegata. From left to right:—top-row, a basal bractole, an open male flower, an unopen male flower with one bractole removed to show the perianth, the perianth of a male flower cut open; second row, a diagrammatic t.s. of a male flower with the two bracteoles and cupular perianth, 5 normal pairs of fully extended stamens, 2 pairs with one stamen more or less aborted, a solitary stamen, a tristis-pinnate male flower with rudimentary pistle (the perianth cut open); third row, 2 mature gall-flowers, 2 perianths of gall-flowers, a young gall-flower with the perianth unfolded, a gall-flower with its pistil displayed; bottom-row, 2 immature female flowers with the pistils displayed, 3 mature female flowers; $\times 10$.

is 12—13 weeks and that of the gall-receptacles 7—8 weeks, which correspond closely with the periods in *F. fistulosa* although the receptacles are a little larger. The interval between successive crops of gall-receptacles varied from 9 days to 4 months on different plants, but on vigorous plants it probably averages about 2 weeks: the interval between the successive crops of female receptacles may be rather longer, averaging about a month, but in one case of a vigorous young tree there was an interval of 3½ months, and in another case of an old tree the new crop developed about three weeks before the old one had ripened. But my observations on the female plants have largely been spoiled by monkeys and squirrels, which devour the female receptacles, ripe or unripe, and not the gall-receptacles. I have noticed this also in *F. fistulosa*. The seeds are thus dispersed by animals and the pollen and the pollinating insects are left unharmed: perhaps the gall-wasps render the figs unpalatable. As regards the dispersal by animals, Docters van Leeuwen records this species as one of the most conspicuous trees on the island of Sebery in the Sunda Strait, the vegetation of which was more or less destroyed by the famous eruption of Krakatau: he speaks, however, of its white trunks (1).

As described by Holttum, under the name of *F. polysyce* (3), this species is deciduous. The leaves fall off gradually and the crown becomes bare: then, in a few days or after a week, the new leaves develop all over. The interval between successive leaf-changes varies considerably and may depend upon the incidence of dry and wet weather, which is irregular in Singapore; it is not a facultative habit caused by a prolonged dry season. Holttum found that the interval varied between 4.8 and 6.7 months in a large vigorous gall-tree, with the leaf-change in January or the beginning of February and again in July or August. I found similar periods in six other plants during 1932, but with greater latitude. Thus in a vigorous young female tree the interval was only 2½ months with the leaf-change about September 22nd and December 5th; in an old female tree it was 8 months; but the year was exceptional in many climatic respects. As mentioned by Holttum, the production of receptacles appears to have no relation to the leaf-cycles. The deciduous habit, so well-marked, is another difference from the malayan species of Covellia.

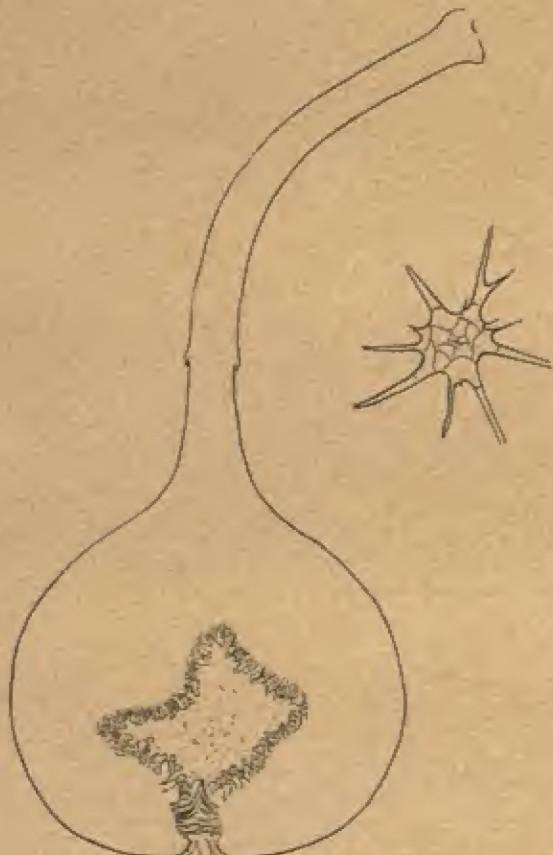
F. viridicarpa nov. spec.

Arbor habitu, foliis, receptaculis floribusque *F. variegatae* similis, sed differens:—trunci als basilibus vix evolutis; cortice griseo-albido; venis lateralis foliarum pluribus utrinsectis 7—11, e costa angula 80—90 excurrentibus; receptaculis majoribus, 3—4 cm. lati, parietibus crassioribus, 6—10 mm., caverna minori, ostio immerso, sulcis 5—10 angustis radiato-striato, in maturitate viridibus; ramulis dructuosis usque 20 cm. longis; perianthio flosculi masculini basim versus breviter cupulato, segmentis duobus longis concavis obtusis vel breviter acuminatis oppositis, staminibus primum tegentibus, praeterea segmentis 1—2 minoribus lanceolatis, praedito.

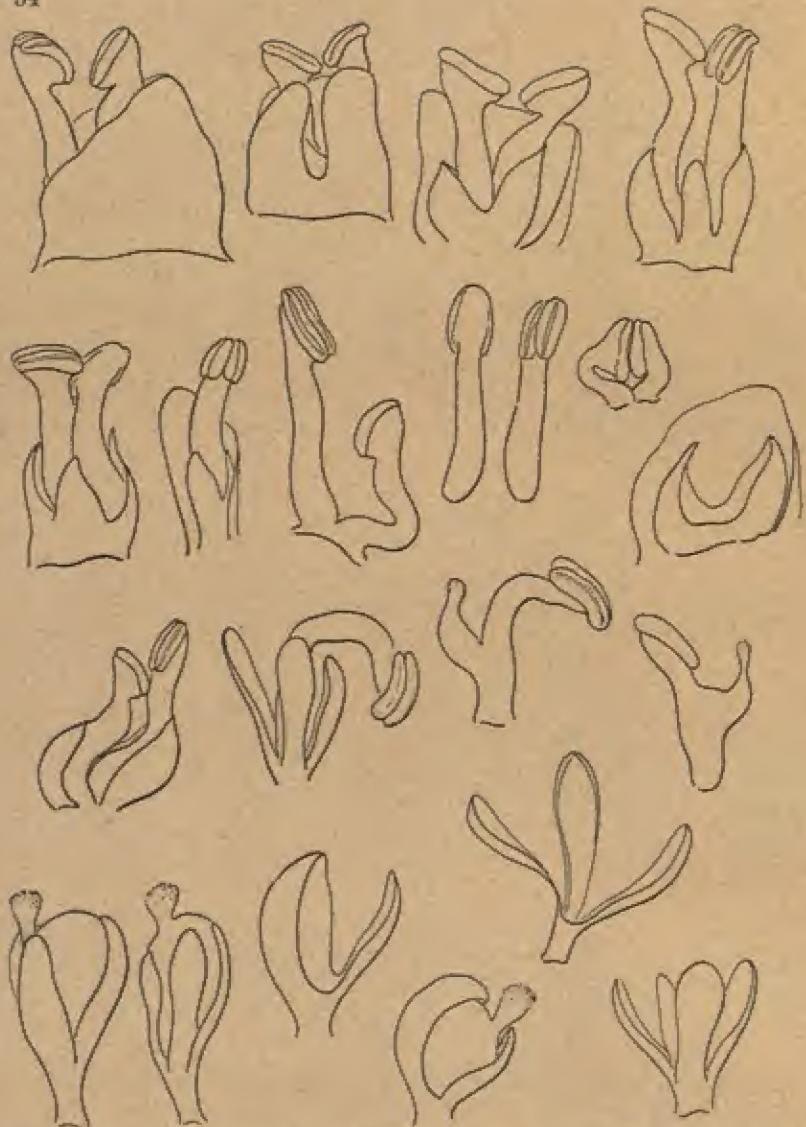
Tree 70 ft. high; trunk 2 ft. thick at 5 ft. from the ground, without or with slight buttresses; bark greyish white; latex white, copious.

Typically glabrous; young shoots often finely puberulous with minute white downy hairs, occasionally persistently puberulous on the veins on the underside of the leaves.

Leaves alternate, mesophytic, ovate, rarely elliptic or sub-obovate, generally widest below the middle, with the apex gradually or rather suddenly acuminate, 10–18 mm. long, dark green with light yellow midrib and veins on the upperside; edge entire or irregularly and distantly subserrate; blade 11–25 x 7–15 cm., with 7–11 pairs of primary veins, generally 9, making



Text-Fig. 27. The receptacle of *F. viridicarpa* in section, $\times 1\frac{1}{2}$; the orifice, $\times 3$.



F. viridicarpa. From left to right:—*top-row*, 2 open male flowers (one with incised bracteoles), a male flower with one bracteole removed and another with both removed to show the perianth; *second row*, a male flower with the bracteoles removed, a unistaminate male flower with one bracteole removed, an unequal pair of stamens, two solitary stamens, a normal pair of unextended stamens from the bud, a male flower showing a bracteole and the perianth; *third row*, a male flower with a completely 2-cleft perianth, a unistaminate male flower with tripartite perianth from among the gall-flowers, 2 pairs of stamens with one stamen aborted; *bottom-row*, 3 mature gall-flowers, 3 perianths of gall-flowers; x 10.

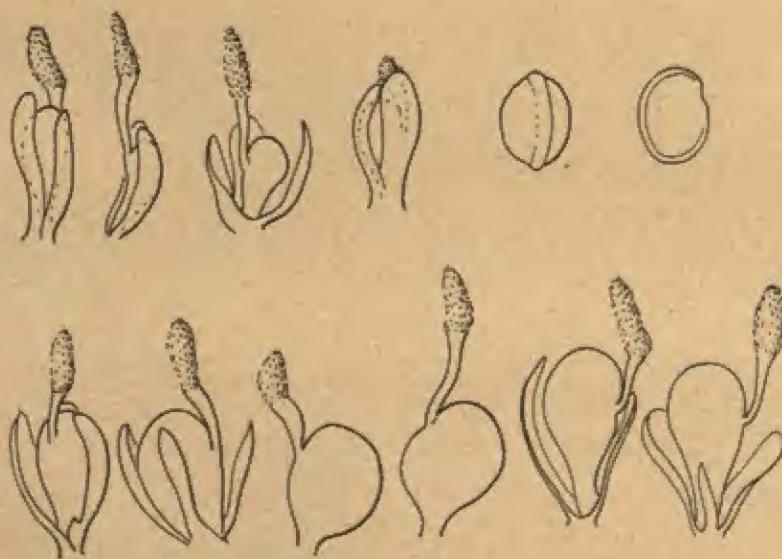
nearly a right angle with the midrib; base generally distinctly though not deeply cordate, occasionally simply rounded, equal, with 5—7 veins; petiole 4.5—15.5 cm. x 2—3 mm., slender; stipules glabrous, lanceolate, 10—25 mm. long.

Receptacles cauliflorous as in *F. variegata*; fruiting branches up to 20 cm. long, occasionally leafy at the tip, frequently branched, the fig-clusters generally much larger; shaped as in *F. variegata*, but the peduncles generally longer, the body rounder, larger, 3—4 cm. wide with the neck 7—15 mm. long, with much thicker walls, 6—10 mm., and narrow angular cavity, with a sunken plicato-striate orifice; ripening green; peduncles 3—6 cm. x 3—4 mm., becoming thinly brown scurfy; basal bracts 3 in a collar, widely triangular, early caducous, 1 mm. long x 2—3 mm. wide; lateral bracts absent; orifice deeply sunken, 2—4 mm. wide, surrounded by an abrupt tumid margin radially fissured by 5—10 deep narrow simple, rarely furcate, grooves of unequal extent up to 4 mm. long, with the apical bracts concealed, closed by numerous internal bracts; internal bristles absent.

Female flowers 2.5—3.8 mm. high, as in *F. variegata* but with a longer, slender style, 1.4—2.2 mm., with a longer stigma, .6—1 mm.; seeds as in *F. variegata*, 1—1.5 mm. long.

Gall-flowers 2.5—3.5 mm. high, as in *F. variegata*; style short, .5—.7 mm. long, with a short rounded stigma.

Male flowers in several irregular rows; 1.5—2.5 mm. long, as in *F. variegata*; bracteoles subrectangular or trapezoid, sometimes more or less deeply incised or bilobed, very slightly imbricating if at all, glabrous; perianth 1.3—2 mm. high, generally composed of two deeply concave, laterally compressed lobes with obtuse or subacute, rarely acuminate, apices, shortly



Text-Fig. 29. *F. viridicarpa*. From left to right:—above, 4 young female flowers, 2 seeds; below, mature female flowers: x 10.

gamophyllous at the base and forming a very shallow cupule, .5—.7 mm. high, but often with a short lanceolate or spatulate lobe between them on one side, rarely on both; (thus the perianth is composed of 2—4 segments shortly gamophyllous at the base, with two segments always much enlarged, opposed and enveloping the young stamens); stamens 2—3 mm. long, 2, rarely 1 or 3, generally equal with the anthers opposed, without bristles; occasionally among the gall-flowers are male flowers with a perianth of 2—3 segments, as in the gall-flowers, containing 1 fertile stamen and an abortive ovary.

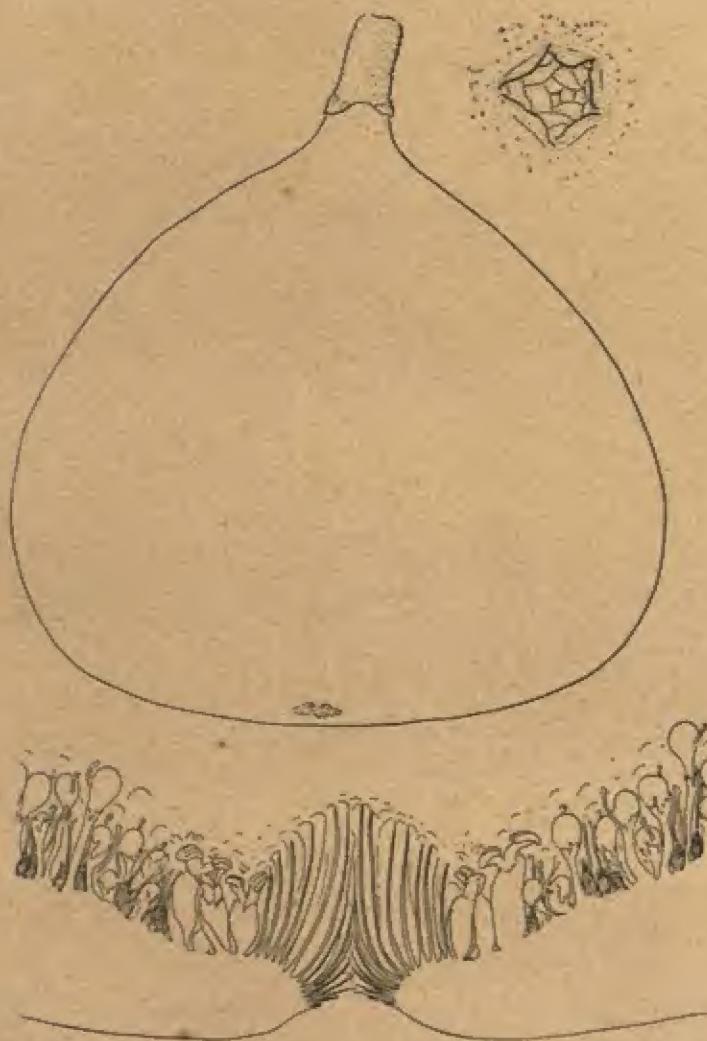
Neuter flowers as in *F. variegata* but without stamens, staminodes or ovary.

Malay names—*kelepong* (Jelebu, Tampin).

Type-collections—S. 26032 (gall), Jelebu, Negri Sembilan, 29.10.32; S. 26133 (female) pr. Tampin, N. Sembilan, 27.1.33.

This species is based on a very handsome, large gall-tree growing about three-quarters of a mile from Jelebu on the right hand-side of the road to Kuala Pilah, and on a smaller female tree about twenty yards down the bank opposite the sixth milestone on the road from Tampin to Kuala Pilah; it is probably widely distributed in the middle of the peninsula. I cannot trace it to any species from the east or from Africa. It is close to *F. variegata* but differs in so many points that I have no hesitation in giving it specific rank, although taken singly each point is trivial enough. In the field it can be told at once by the greyish white bark, the lack of prominent buttresses, the darker green leaves with more conspicuous light yellow midrib and main veins on the upperside, the larger, looser, more ramified bunches of receptacles with rounder body, very thick sides, reduced angular cavity, sunken plicate orifice, and the fact that the receptacles ripen green: they become light fuscous on beginning to decay but never have a trace of red. In the herbarium it can be told by the more ovate leaves with generally longer petioles and more primary veins, which arise at a much wider angle from the midrib, by the very shortly gamophyllous perianth with two large boat-shaped segments in the male flower with its often deeply incised bracteoles, and the longer, slenderer style in the female flower, if the grosser characters of the receptacles cannot be made out. Moreover, on direct comparison one can see finer differences in venation which are impossible to describe satisfactorily: thus, in *F. viridicarpa*, the secondary veins are more distant and less regularly transverse, especially near the midrib, from which one or two of them may pass out at right angles between the primaries for a distance of 1—2 cm. and then be sharply deflected basiscopically, and the primaries fork and inarch further from the margin. The walls of the receptacle are absolutely, and relatively to the size of the whole, much thicker than in any other of the malayan species, apart from the climbers of the section *Synoecia*. The styles of the gall- and female flowers are more distinctly dimorphic than in *F. variegata*: and it is a finer tree, in its caulinory even more spectacular.

At the end of October, 1932, a crop of gall-receptacles was ripening on the tree at Jelebu, and another crop in the middle of January, 1933. This suggests a developmental period of 7—8 weeks as in *F. variegata*.



Text-Fig. 30. *F. glomerata*. The receptacle, $\times 2$; the orifice, $\times 3$; a section through the orifice showing the arrangement of the flowers, the female flowers stippled.

F. glomerata Roxb.

A small spreading tree up to 40 ft. high; trunk squat, with slight but distinct buttresses, up to 2½ ft. thick at 3 ft. from the ground, dividing into several small trunks, 4—8 in. thick, at a low height; bark smooth, light greyish fawn, appearing greyish white from a distance; latex copious, white, soon becoming pale brown and very sticky on exposure.

Young shoots and receptacles minutely pubescent with white, adpressed hairs, soon glabrous but the peduncle and receptacular bracts generally persistently hairy, the hairs becoming brownish; stipules densely adpressedly hairy.

Leaves: alternate, subcoriaceous, oblong-elliptic to subovate, or oblong-lanceolate, rarely ovate, tapered gradually to a blunt apex up to 10 mm. long, light green with pale yellowish nerves on the upperside; *blade* 6—15 x 3.5—7.2 cm., with 4—8, generally 6, primary veins; secondary veins transverse, subparallel, rather irregular especially near the midrib; *edge* entire or vaguely dentate toward the tip; *base* rather narrowly cuneate to broadly rounded, never cordate, with 3 basal veins and often another minute pair; *petiole* 1.5—6 cm. long x 2—3 mm. wide, soon brown scurfy; *stipules* 4—12 mm. long, or up to 25 mm. on young shoots and subsessile.

Receptacles caulinorous on leafless, sparingly or rather copiously branched, rigid, gnarled, woody fruiting twigs up to 25 cm. x 2 cm. thick at the base, projecting singly or 2—3 together on small tubercles from the trunk at 1—2 ft. from the ground and along the main branches, not axillary and not hypogaeal; fruit-clusters up to 25 cm. wide; shortly pedunculate, globoso-depressed becoming truncato-pyriform, smooth, not ridged, light green then with several pale rose-red longitudinal stripes, finally wholly deep rose-red with faint darker stripes, the wall red throughout, the body 34—48 mm. long x 36—50 mm. wide, the neck 0—5 mm. long; *peduncle* 3—8 mm. x 3—4.5 mm., greyish brown; *basal bracts* 3 in a collar, short and blunt to triangular sub-acute, with a broad base, often rather indistinct or splitting, 1—2 mm. long; *lateral bracts* absent; *orifice* plane, becoming slightly sunken at maturity, 4—5 mm. wide, with 5—6 small, blunt, peripheral apical bracts, closed by numerous small colourless internal bracts, rarely 1—2 apical bracts displaced on to the body; *internal bristles* absent; *perianth* wine-red.

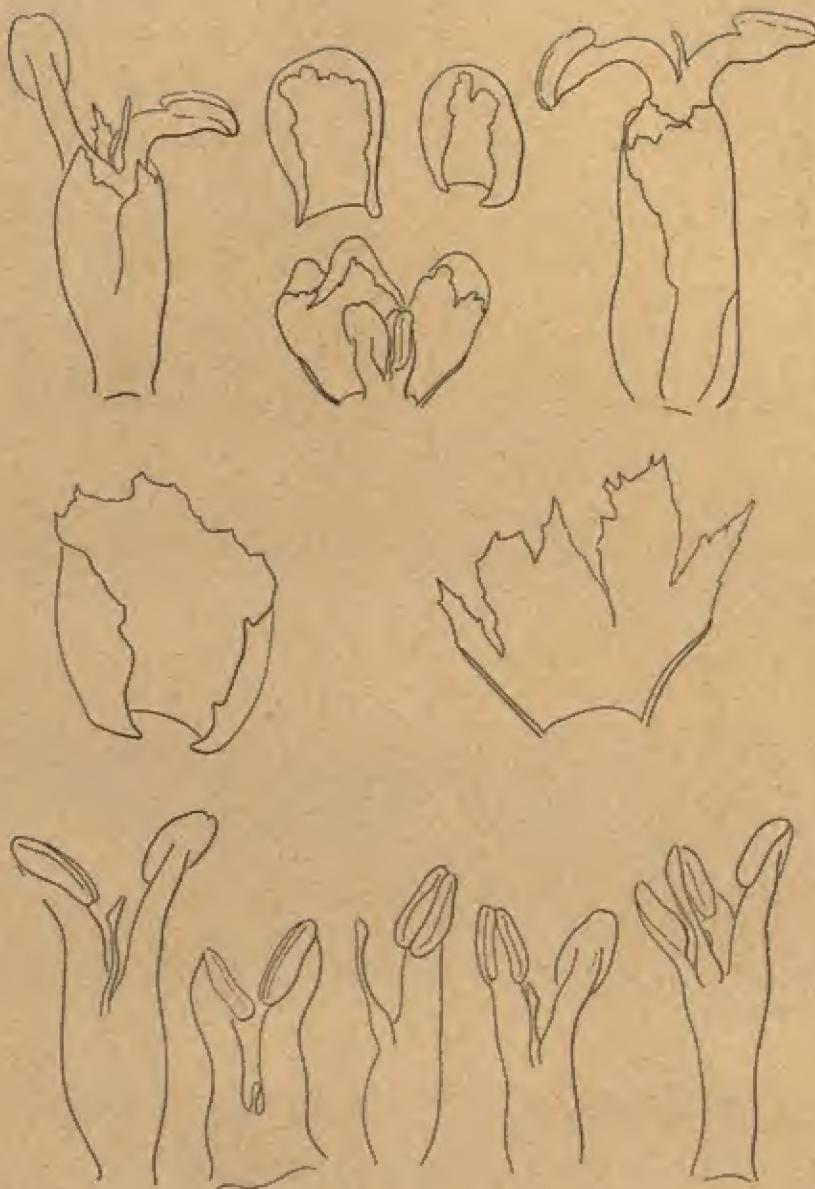
Female flowers 3—4 mm. high, sessile or very shortly stalked, crowded between the bases of the gall-flowers; *perianth* 2 mm. high, covering the ovary, with 3, rarely 4, irregularly dentate, obtuse or acuminate segments, often folded and hooded in the bud, united below into a gamophyllous cup covering the lower third or half of the ovary; *ovary* sub stipitate or sessile; *style* 2.5—3 mm. long, slender, slightly curved, glabrous; *stigma* subclavate, simple, often slightly flattened, minutely papillate, 5 mm. long; *seeds* as in *F. variegata*, ellipsoid, slightly compressed, ca. 1 mm. long.

Gall-flowers 4—10 mm. high, with long stalks; *perianth* as in the female flowers; *style* rather short, 1—2 mm., glabrous, often flexuous; *stigma* as in the female flower but distinctly clavate, obconic, not discoid nor infundibuliform.

Male flowers 3.5—5.5 mm. high, in 2—3 rows round the orifice, sessile, flattened, essentially as in *F. variegata*; *bracteoles* broad, semicircular to subrectangular, with the ends shortly imbricating, hooded in the bud, irregularly dentate, rarely incised, glabrous; *perianth* as in the female flower but larger, 2—4 mm. high, the segments hooded in the bud; stamens 2, not infrequently 1, rarely 3, opposed, the filaments connate for about half their length, 3—5 mm. high, with the anthers 1—1.3 mm. long, generally with a small abortive ovary and style borne on one or other filament at their point of separation.

Malay name:—kelepong (K. Pilah district, N.S.).

Collections:—Ridley s.n., Pulau Jellam, Pahang, 1891; Burkill 6882, Penang; S. 26135, N. Sembilan.



Text-Fig. 31. *F. glomerata*. From left to right:—top-row, a mature male flower with the bracteoles removed, the lower and upper bracteoles of the young male flower-bud shown beneath with the perianth cut open, a mature male flower undissected; second row, a bracteole and a perianth (cut open) of a mature male flower; bottom-row, the mature androecium showing the abortive ovary, one unistamine, one tristamine: $\times 10$.



Text-Fig. 32. *F. glomerata*. From left to right:—top-row, four mature gall-flowers, the second being a transitional flower, the third being morphologically a female flower in which an insect has developed and eaten its way out; second-row, a young gall-flower, a young female flower with the perianth displayed, a young gall-flower with the perianth cut open, a young female flower with the perianth cut open, a gall-flower with the ovary removed and the perianth displayed; bottom-row, a young transitional flower, a transitional flower, with the perianth cut open, a transitional flower containing a seed, two young female flowers (one with the perianth cut open), two seeds, a mature female flower: $\times 10$.

A few trees of this species grow by the road from Kuala Pilah to Bentong in the swampy secondary forest between the 30th and 32nd mile from K. Pilah. Ridley's and Burkhill's collections were unidentified. This is the first record of the species in the peninsula; it is known from India, Indo-China, Siam and Java, and may prove to be as wide-spread as *F. variegata*. It is easily recognised from the rather small glabrous leaves with entire edge and cuneate base and the large, cauliflorous, rose-red receptacles. *F. pomifera* is superficially similar but it has larger, coarsely dentate leaves and receptacles with the orifice deeply depressed and umbilicate. The ripe receptacles smell pleasantly of apples but were said by some malays, whom I questioned, to be inedible. The gall-flowers are exceptionally big. The habit of growth is well illustrated by Koorders.

**A Key to the malayan species of Covellia and Neomorphe
on the characters of the receptacle.**

Receptacles persistently hairy

Receptacles densely hispid-villous with pale brown hairs; pinkish red, then dark brown: geocarpic

F. Beccarii, *F. geocarpa*

Receptacles sparsely hispid with blackish brown hairs; ripening dingy greenish black: geocarpic

F. chamaescarpa

Receptacles sparsely or minutely pubescent with pale hairs

Receptacles ripening rose-red, not above 2 cm. wide: geocarpic

F. cunia

Receptacles ripening yellowish, ca. 3 cm. wide

F. hispida

Receptacles glabrous or glabrescent

Receptacles with 5—10 short fissures round the orifice, ripening green

F. viridicarpa

Receptacles with 5 prominent ridges round the apex

F. Scortechinii

Receptacles even at the apex

Orifice deeply depressed; receptacles massive, ca. 4 cm. wide

Peduncles 1—3 cm. long

F. obpyramidalis

Ripening yellow-brown

F. pomifera

Ripening rose-red

Peduncles less than 1 cm. long; orifice scarcely depressed; ripening rose-red

F. glomerata

Orifice not or scarcely depressed; receptacles rarely above 3.5 cm. wide, generally much less

Apical bracts very numerous, umbo-nate-tuberculate, in a large rosette

F. Miquelii

Apical bracts few, flattened, in a small rosette

Receptacles sessile, axillary, ellipsoid

F. lepicarpa

Receptacles pedunculate, cauliflorous, pyriform

Peduncles 1—6 cm. long

F. variegata

Ripening rose-red; with 4 peripheral apical bracts

F. fistulosa

Ripening yellowish; with 5 peripheral apical bracts

Peduncles less than 1 cm. long; ripening rose-red; massive

F. glomerata

**A Key to the malayan species of Covellia and Neomorphe
on vegetative characters.**

Leaves unequal at the base

Densely hispid hairy (hairs 1—2.5 mm. long); 5—9
prs. of primary veins

Hairs white or pale brown

F. geocarpa

Hairs dark brown or black

F. chamaecarpa

Shortly villous-hairy (hairs .5—1 mm. long); 9—14
prs. of primary veins

F. cunia

Leaves equal at the base

Leaves more or less cordate at the base

Large trees with alternate, ovate, generally
glabrous leaves with long petioles (up to 15 cm.)

Leaves with 8—9 prs. of primary veins

F. viridicarpa

Leaves with 5—6 prs. of primary veins

F. variegata

Small trees with generally opposite, elliptic to
obovate leaves with shorter petioles (rarely
above 8 cm.)

Young shoots and leaves minutely ad-
pressedly hairy, soon glabrous; 8—11
prs. of primary veins

F. lepicarpa

Young shoots and petioles densely hispid
with stiff brownish hairs; 5—10 prs.
of primary veins

F. obpyramidalis

Shoots and leaves hispid-scabrid with
short white hairs; with 4—7 prs. of
primary veins

F. hirsuta

Leaves broadly rounded or cuneate at the base

Leaves persistently densely hairy beneath, glabrous
above, oblong-lanceolate with a very long tip
(3—7 cm.)

F. Beccarii

Leaves glabrescent

Petioles long (up to 6 cm. or more), glabrous;
leaf-tip short

Leaves broad, ovate, distantly toothed, with
long petioles (up to 12 cm.)

F. pomifera

Leaves elliptic to obovate, entire, with shorter
petioles (up to 6 cm. long)

Leaves large, 3—15 cm. broad, obovate,
often opposite; stipules glabrous

F. fistulosa

Leaves small, 3—7 cm. broad, elliptic to
obovate-lanceolate; stipules hairy

F. glomerata

Petioles short (up to 1 cm. long), adpressedly
hairy, at least when young; leaves narrow, 2—8
cm. wide, with a long narrow tip

Petioles persistently hairy; stipules per-
sistent

F. Scortechnii

Petioles glabrescent; stipules caducous

F. Miquelli

SUMMARY.

Ten malayan species of Covellia and four of Neomorphe are described. *F. Beccarii*, *F. chamaecarpa*, *F. geocarpa*, *F. variegata* and *F. glomerata* are newly recorded for Malaya. *F. viridicarpa* n. sp. is described from Negri Sembilan.

F. fasciculata King has not been rediscovered and may be only *F. obpyramidata*. *F. polysyce* Ridley is a synonym *pro parte* of several species. *F. staphylolyce* Ridley is *F. Scortechinii*. *F. nota* (Blanco) Merrill is probably *F. obpyramidata*.

The structure of the receptacles and the flowers is described in detail and the species are arranged accordingly. *F. pomifera* (Neomorphe) should be placed in the same group as *F. obpyramidata* (Covellia), with which it is closely allied. *F. variegata* and *F. viridicarpa*, belong to a distinct group of Neomorphe. *F. cunia* is exceptional in Covellia in having a partite perianth. It is doubtful if either Covellia or Neomorphe are natural subgenera.

In both subgenera the male flowers have two bracteoles and a gamophyllous perianth with 1—3 lobes, and not a perianth of three imbricating pieces as formerly described. Neuter flowers, similar in construction to the male flowers, but generally without a stamen or ovary, occur in a circle round the orifice of the female receptacle.

F. glomerata is highly distinctive in being monoecious with all three kinds of flower in the same receptacle. It has transitional gall-female flowers but no neuter flowers.

The geocarpic habit of *F. Beccarii*, *F. chamaecarpa* and *F. geocarpa* is described. The fruiting branches may act as stolons so that the plants tend to grow in close stands. It is evidently a further development of the kind of cauliflory that occurs in *F. hispida*.

Excepting *F. glomerata*, all the species are dioecious. The gall-receptacles in *F. fistulosa* and *F. variegata* ripen more rapidly than the female receptacles. In *F. fistulosa* the female receptacles require from inception about 12 weeks, the gall-receptacles 8—9 weeks; in *F. variegata* 12—13 weeks and 7—8 weeks respectively. *F. variegata* is deciduous.

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Some Malayan Orchids IV.*

By C. E. CARR, F.L.S.
(with thirteen plates.)

The plants enumerated in this paper were collected around Brastagi and the Kaban Djahe plateau in North Sumatra between September 5th and 16th 1931.

Practically the whole plateau has been in cultivation for a very considerable time and is either grazing land or under rotational cultivation with large areas fallow for long periods. It is comparatively well equipped with roads which permit of visits being made to most of the surrounding hills, while a new road was in course of construction across the hills to the North West of Lake Toba.

The Kaban Djahe plateau extends for approximately 40 kilometres in a direct line from Brastagi to Piso Piso, a hill near the North East corner of Lake Toba and an excellent view of it is obtainable from the Brastagi Hotel above the village. It has the appearance of an almost flat or gently undulating country easy of access in all directions and covered with jalang, bracken and scrub. Here occurred such species as *Spiranthes australis* Lindl., *Phaius Incarvillei* Bl., *Arundina speciosa* Bl., etc. In reality, however, the surface is cut up by frequent very deep broad valleys with exceedingly steep sides, the bottoms of which are cultivated in padi, vegetables, etc. Patches of forest are left at intervals on the banks of these valleys but they have been extensively worked for timber. On the ground in these woods grew such species as *Goodyera pusilla* Bl., *Hetaeria grandiflora* Ridl. and *Microstylis sumatrensis* Ridl., while characteristic of the epiphytes were such plants as *Dendrochilum brevilabre* Ridl., *Liparis angustiflora* J. J. S., *Dendrobium heterocarpum* Wall., *Sarcochilus fraternus* J. J. S., *Schoenorchis juncifolia* Bl., etc.

Visits were paid to the forest on the hills between Brastagi and Gunong Sibajak, Gunong Baros, etc. and on several occasions along the new road above Lake Toba, the area between the 38th and 61st kilometres receiving most attention. It was fortunate that many trees had been recently felled here on each side of the road.

While the lowland flora of Sumatra bears considerable resemblance to that of the Peninsula that of the mountains is very distinct and of the plants found only 34 species are at present known to occur in this country. The affinity of the Sumatran mountain flora is undoubtedly with that of the mountains of Java, while the Himalayan element is more pronounced in Sumatra than in this country owing possibly to its far larger mountainous area attaining higher altitudes than is the case in the Peninsula.

*The first three numbers of this series of papers were published in the Gardens Bulletin, S.S.

It might be supposed that our mountains, distant only approximately 250 miles from the Sumatran range at this point, would support an orchid flora containing a great many species in common with the Sumatran hills. Lowland forest, however, forms seas surrounding mountain ranges which are an impassable barrier to those species to which the climate of the higher altitudes is necessary for existence. If distance is sufficiently great the minute wind-borne seeds are unable to cross it.

Those species which prefer the summit ridges in full exposure might be expected to stand the best chance but though exposed on the hills they are subject to seasonal clouding which, in addition to rain, supplies them with all the moisture they require during the growing season. At lower altitudes the flora changes. The crowns of the tallest forest trees, which catch the most sunlight, attain a much greater height above the ground. Moisture is greatly reduced while temperature is much higher.

The hills surrounding the Kaban Djahe plateau are covered by rather thick forest to the summits. In few places, such as Gunong Baros, was real mossy forest encountered. The summit of this mountain, however, was extremely mossy with rather more stunted moss-grown trees which supported the epiphytic *Calanthe epiphytica* n. sp. In places, as along the new road N. W. of Lake Toba, the undergrowth consisted in parts of thickets of a tall moss-grown *Pandanus* beneath which grew *Calanthe crumenata* Ridl., *C. rigida* Carr var. *gracilis* and the pretty, small, white *C. angustifolia* Lndl. var. *sumatrana*. The felled trees on each side of this road provided a rich harvest and, as might be expected, species of *Bulbophyllum* § *Desmosanthes* and *Dendrochilum* § *Platyclinis* were very much in evidence as also such plants as *Pholidota ventricosa* Rchb.f., *P. globosa* Lndl., *Coelogyne sulphurea* Rchb.f. and the section *Longifoliae*. The interesting *Gynoglottis cymbidioides* J. J. S. also grew here.

The most interesting plant found was *Herpsyna sumatrana* n. sp. This is the first record of the genus in Malaysia. It was interesting to find the Bornean *Corybas Johannes Winkleri* J. J. S., a very distinct species with lateral sepals and petals adnate at the base.

The collection totals 130 species comprised in 45 genera and of these 18 appear to be hitherto undescribed. In addition 6 new varieties are proposed while another variety is now given specific rank. On the other hand it is deemed advisable to make certain reductions.

The following figures illustrate the geographical distribution of the plants comprised in the collection.

Endemic	54
Common to Sumatra and the Malay Peninsula.....	34
Common to Sumatra and Borneo.....	26
Common to Sumatra and Java.....	64

Of the 34 species which are found in the Malay Peninsula 28 also occur in Java while of the 26 Bornean species 22 are known from Java. More conclusive still are the following.

Common to Sumatra and the Peninsula only.....	5
Common to Sumatra and Borneo only.....	5
Common to Sumatra and Java only.....	28

While the above figures cannot be considered as final owing to the fact that our knowledge is far from complete they do render sufficient evidence of the relationship of the orchid flora with that of the neighbouring countries. It must be remembered, however, that the present paper deals only with the Sumatran hills and that no collecting was done below 2,000 feet. Endemism is high while the affinity with Java is very pronounced, the main mountain range of both countries being interrupted only by the narrow Sunda Strait.

Corybas Johannes Winkleri, J. J. S. in Bull. Inst. allg. Bot. Hamb. VII (1927) 14, t.I.f.4.

Terrestrial in the forest along the new road West of Lake Toba, in humus, altitude about 5,000 feet, Carr No. 2117.

Distribution:—Borneo.

Nervilia petaloidea, sp. nov. Pl. I. fig.A. Tuber ovale vel oblongum, supra subitus leviter complanatum. Inflorescentia erecta, 1-flora, pedunculo terete basi vaginis tubulosis tecto. Bractea basi breviter tubulosa, parte libera lanceolata, acuta. Flos haud expansus. Sepala petalaque anguste oblongo-ob lanceolata, brevissime acuminate, acuta, super basin leviter angustata. Labellum petaloideum, anguste oblongo-ob lanceolatum, acutum. Gynostemium rectum, stigmate transverse ovali margine elevato apicem versus triangulari-producto.

Tuber oval to oblong, rather flattened above and below, very laxly furnished with low conic roots, c. 1.70 cm. long, c. 1.40 cm. wide, c. .90 cm. thick. *Leaf* not seen. *Inflorescence* erect, 1-flowered; peduncle terete, tapering upwards, clothed with a few short imbricating sheaths at the base with a longer one about the middle, c. 10 cm. long. *Bract* free part lanceolate, acute, base shortly tubular, c. .85 cm. long, c. .22 cm. wide. *Flower* not expanded, uniformly pale yellow. *Sepals* and *petals* narrowly oblong-ob lanceolate, very shortly acuminate, acute, slightly narrowed above the base, 3-nerved, convex outside, concave inside, the dorsal sepal c. 1.90 cm. long, c. .40 cm. wide, the laterals c. 1.80 cm. long, c. .32 cm. wide with the posterior margin incurved, the petals c. 1.70 cm. long, c. .30 cm. wide. *Lip* entire, petaloid, narrowly oblong-ob lanceolate, acute, 3-nerved, the nerves branched, convex keeled outside, concave inside, c. 1.75 cm. long, c. .35 cm. wide. *Column* continuing

the ovary, straight, little dilate at base and apex, shortly keeled on the back towards the apex, the apex itself abruptly narrowed and produced to a short roundly triangular obtuse recurved lobe, c. 1.10 cm. tall (fecundate). Stigma transversely oval, margin elevate and produced in front to a short triangular acute lobe which is recurved and appressed to the face of the column. Anther seen from above oblong, concave above, sides dilate, apex recurved acute, c. .14 cm. long, c. .17 cm. tall. Pollinia 2, pyriform.

The plant is readily distinguished by the petaloid lip. Both specimens seen were self-pollinated.

New road near Piso Piso, terrestrial on the upper slopes of a narrow very deep wooded ravine, altitude c. 4,500 feet, Carr No. 2118.

Described from material preserved in spirit and colour notes.

Spiranthes sinensis Ames Orch. II (1908) 53; *S. australis* Lindl. Bot. Reg. t. 823; J. J. S. in Fl. Buit. VI (Orch.) 81, Atlas No. LV.

Near Soebakti on a roadside bank, c. 4,500 feet, Carr No. 2044.

Distribution:—Throughout the East from India to China and Japan, New Guinea and Australia.

Goodyera pusilla, Bl. Fl. Jav. Orch. 31, t. 9b, f. 3; J. J. S. in Fl. Buit. VI (Orch.) 127, Atlas No. XCIV.

Terrestrial in a small wood on an open hill above Brastagi village, altitude c. 4,800 feet, Carr No. 2058.

Distribution:—Java.

Kuhlhasseltia javanica, J. J. S. in Ic. Bog. iv (1910) 3 t. 301.

New road West of Lake Toba, terrestrial in the forest above a quarry near the 60th kilometre, altitude c. 5,000 feet, Carr No. 2120.

Distribution:—Java.

Herpysma sumatrana, sp. nov. Pl. 1, fig. B. Caulis elongatus, basi repens, superne erectus, c. 9-folius. Folia ovata vel ovato-lanceolata, breviter acuminata, acuta, petiolo intus concavo, vagina basi tubulosa superne patente intus concava. Inflorescentia apicalis, multiflora, rachide pilosa. Flores albi. Sepala extus pilosa. Sepalum dorsale oblongo-obovatum, breviter acuminatum, apiculatum. Sepala lateralia oblongo-lanceolata, breviter acuminata, acuta. Petala ad sepalum dorsale adpressa, subrhomboid-obovata, acuta, margine apicem versus minute erosulo. Labellum marginibus basi gynostemio adnatis, super basin valde reflexum, 3-lobum, calcaratum, carinis 2 brevibus triangularibus inter lobos laterales, lobis lateralibus rotundatis, lobo intermedio quadrato-ovato marginibus undulatis carino medio donato, calcare cylindrico apici bilobo. Rostellum bilobum. Pollinia 2, pyriformia, utroque disco trianguli truncato denticulato conjuncto.

Stem long-creeping, base prostrate rooting at the nodes, c. .50 cm. diam., branched, upper part erect leafy, c. 60 cm. long, internodes 2-3 cm. long glabrous. *Leaves* c. 9, glabrous, ovate or ovate-lanceolate, shortly acuminate, acute, slightly oblique, petiolate, strongly keeled beneath with some strong nerves on each side, upper ones reduced to sheaths, green, up to c. 10 cm. long, c. 3.50 cm. wide, petiole grooved up to c. 2.40 cm. long, sheath tubular at the base with apex free spreading, concave inside convex ribbed outside c. 2.40 cm. long. *Inflorescence* terminal, many-flowered, peduncle terete with a few sheaths up to c. 12 cm. long, rachis densely hairy c. 13 cm. long. *Bracts* oblong-ovate, very shortly acuminate, acute, 3-nerved with the outer nerves branched, shortly hairy outside, c. 1.60 cm. long, c. .85 cm. wide. Flowers white. *Dorsal sepal* arched, oblong-obovate, shortly acuminate, apiculate, 3-nerved, inside concave, outside convex hairy, c. .90 cm. long, c. .40 cm. wide. *Lateral sepals* oblong-lanceolate, shortly acuminate, apiculate, 3-nerved, inside concave, outside highly convex hairy, c. 1 cm. long, c. .38 cm. wide. *Petals* appressed to the dorsal sepal forming a hood, subrhomboid-obovate, acute, 3-nerved, glabrous, margins minutely erose in the upper half, c. .90 cm. long, c. .43 cm. wide. *Lip* with margins shortly adnate at the base to the column, 3-lobed, spurred, base erect, strongly reflexed from the middle of the blade and appressed to the base of the spur, 2 short triangular obtuse keels on the blade between the side lobes, spread out including the spur c. 1.75 cm. long, c. .50 cm. wide across the side lobes; side lobes long, broadly rounded, margins undulate, posterior margin c. .70 cm., anterior c. .20 cm. long; midlobe quadrate-ovate with rounded angles, very shortly acuminate, obtuse, a median keel running from the apex of the blade almost to the apex of the midlobe, margins undulate, c. .33 cm. long, c. .42 cm. wide; spur parallel to the ovary, cylindric, little incurved about the middle, apex very slightly recurved narrowed very shortly bilobed, grooved on the back, sparsely warty inside in the upper half, c. .80 cm. long. *Column* adnate at the base to the margins of the lip, continuing the ovary, dilate upwards, c. .65 cm. tall, clinandrium deeply excavate quadrate, stigma not excavate transversely oblong; rostellum bilobed, lobes triangular obtuse deeply concave above. *Anther* ovate-oblong, obtuse or indistinctly retuse, 2-celled, base grooved, shortly keeled above, c. .40 cm. long, c. .20 cm. wide. *Pollinia* 2, pyriform, each attached to a triangular curved disc, with subtruncate denticulate apex c. .18 cm. long. *Ovary* densely hairy, c. 1.60 cm. long.

This plant is closely related to *H. longicaulis*, Lndl. from Sikkim, Nepal and the Khasia mountains. It differs, however, in the acute bracts, the untoothed larger side lobes of the lip, the warty calli in the spur and the colour of the flowers.

Terrestrial along the path on Gunong Baros at about 5,000 feet altitude, Carr No. 2102.

Described from dried material and an inflorescence preserved in spirit.

Myrmecis gracilis, Bl. Fl. Jav. Orch. 64, t. 21, f. 2; J. J. S. in Fl. Buit. VI (Orch.) 105, Atlas No. LXXIV.

Gunong Baros, terrestrial by the path at an altitude of c. 5,000 feet, Carr No. 2101.

Distribution:—Java.

Hetaeria grandiflora, Ridl. in Journ. Roy. As. Soc. Mal. Br. I (1923) 98; J. J. S. in Bull. Jard. Bot. Buit. II (Suppl.) (1929) t. 10, f. I.

Terrestrial in a wood above Brastagi village at c. 4,800 feet, together with *Goodyera pusilla*, Bl., Carr No. 2057.

Endemic.

Coelogyne Rochussenii, De Vr. Ill. Orch. t. 2, t. II, f. 6; J.J.S. in Fl. Buit. VI (Orch.) 144, Atlas No. CVII.

On the rock face of a very deep narrow ravine near Soebakti, altitude c. 4,500 feet, Carr No. 2049.

Distribution:—Java, Borneo and the Malay Peninsula.

Coelogyne salmonicolor, Rchb. f. in Grd. Chron. II (1883) 328; J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, II (1929) t. 12, f. III. New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2109. Endemic.

Coelogyne sulphurea, Rchb. f. Bonpl. V (1857), 43.

Epiphytic on trees along the new road west of Lake Toba altitude c. 5,000 feet, Carr No. 2012.

Distribution:—Java and Borneo.

Coelogyne brachygyné, J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, II (1920), 25; Bull. Jard. Bot. Buit. Ser. 3, II, Suppl. (1929) t. 12, f. I.

Epiphytic on trunks and branches of trees in the forest along the road west of Lake Toba, altitude c. 5,000 feet, Carr No. 2030.

Endemic.

Coelogyne malintangensis, J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, V (1922), 26; Bull. Jard. Bot. Buit. Vol. II, Suppl. t. 11, f. IV.

Epiphytic on trunks and branches of trees in the forest along the new road west of Lake Toba, altitude c. 5,000 feet, Carr No. 2100.

Endemic.

Coelogyne modesta, J. J. S. in Fl. Buit. VI (Orch.) 141, Atlas No. CIII.

Epiphytic in woods along the new road west of Lake Toba, altitude c. 5,000 feet, Carr No. 2070 and 2080.

Distribution:—Java.

Pholidota ventricosa, Rehb. f. Bonpl. V (1857), 43; J. J. S. in Fl. Buit. VI (Orch.) 154, Atlas No. CXIV.

Epiphytic in woods along the new road west of Lake Toba, altitude c. 5,000 feet, Carr No. 2031 and 2063.

Distribution:—Java and Borneo.

Pholidota globosa, Lndl. Gen. & Sp. Orch. 36; J. J. S. in Fl. Buit. VI (Orch.) 159, Atlas No. CXIX.

Common on trees along the road west of Lake Toba, altitude c. 5,000 feet, Carr No. 2014.

Distribution:—Java.

Pholidota carneae, Lndl. Gen. & Sp. Orch. 37; J. J. S. in Fl. Buit. VI (Orch.), 158, Atlas No. CXVIII.

Epiphytic along the new road west of Lake Toba at an altitude of c. 5,000 feet, Carr No. 2037.

Distribution:—Java, Borneo and the Malay Peninsula.

Pholidota vaginata, sp. nov. Pl. 2, fig. A. Rhizoma breve. Pseudobulbi subapproximati, pyriformes, bifolii. Folia oblongo-oblanceolata, acuta, tenuiuscula, petiolo canaliculato. Inflorescentia inter folios fere maturos orta, folia multo superans, pedunculo gracili terete foliis subaequilongo, rachide basi nonnullis vaginis tubulosis papyraceis imbricantibus donata, flexuosa sinuosaque multiflora. Bracteae caducae, ovato-oblongae, papyraceae. Sepala anguste ovata, obtusa, lateralibus falcatis, dorso carinata. Petala oblongo-ovata, obtusissima vel brevissime retusa. Labellum inconspicue 3-lobum, basi saccatum, lobis lateralibus brevissimis rotundatis, lobo intermedio triangulari obtusissimo marginibus erosulis, carinis 2 ex apice lobarum lateralium convergentibus usque ad medium lobii intermedii fere productis, carina intermedia brevi superposita. Gynostemium breve, alis tortis denticulatis.

Rhizome short, branched. Pseudobulbs subapproximate, pyriform, smooth bright green when young, minutely wrinkled when old, at first covered with large imbricating sheaths, 2-leaved, apical internode c. .15 cm. long. Leaves oblong-oblanceolate, acute, rather thin in texture, margins undulate, beneath keeled with 3-4 strong nerves on each side, up to c. 16 cm. long, c. 5.50 cm. wide, petiole grooved c. 3 cm. long. Inflorescence from the apex of the almost mature pseudobulb between the leaves, up to c. 40-flowered; peduncle slender, terete, dilate towards the apex, nude, c. 16 cm. long; rachis flexuous, sinuous, c. 18 cm. long, base covered for c. 3-4 cm. with closely imbricating persistent papery empty bracts, internodes c. .50 cm. long dilate upwards and grooved on the side facing the flower. Bracts caducous, ovate-oblong, acute, papyraceous, ribbed, c. .87 cm. long, c. .65 cm. wide. Flowers resembling those of *P. carneae* Lndl. but a little larger, sepals and petals greenish ochre. Dorsal sepal narrowly ovate, obtuse, keeled outside, 3-nerved, c. .58 cm. long, c. .33 cm. wide. Lateral sepals narrowly ovate, obtuse,

falcate, 3-nerved, strongly keeled outside, c. .68 cm. long, c. .30 cm. wide. *Petals* oblong-ovate, very obtuse or very shortly retuse, 1-nerved, c. .50 cm. long, c. .18 cm. wide. *Lip* very inconspicuously 3-lobed, saccate at the base, orange-ochre, saccate part ochre, spread out c. .58 cm. long, c. .37 cm. wide; *side lobes* very inconspicuous, rounded; *midlobe* triangular, very obtuse, margins shortly erose, keels 2 from the apex of the side lobes converging and ending abruptly in the middle of the midlobe, a short median keel from the apex of the lateral keels to below the apex of the midlobe. *Column* short, straight, dilate below the stigma, arms twisted with the posterior margin recurved and the anterior margin incurved beneath the stigma toothed at the apex, dark olive green, c. .35 cm. tall, clinandrium excavate, margins toothed, rostellum subquadrate, stigma large excavate suborbicular. *Anther* seen from above broadly cordate, subacute, keeled above, bright red-brown, c. .17 cm. long and a little broader.

A distinct species of the affinity of *P. camelostalix* Rchb. f. from Java. Both species are 2-leaved and the base of the rachis is clothed with imbricating persistent empty bracts. Pfitzer, in Engler's Pflanzenreich IV. 50. (II. B. 7) p. 159 treated *P. camelostalix* Rchb. f. as the type of a new genus *Camelostalix*, renaming Reichenbach's plant *Camelostalix Reichenbachii* Pfitz. These plants are, however, true members of the genus *Pholidota* and should be included as a separate section for which I propose to retain the name *Camelostalix*.

Another form under the same number has leaves narrowly oblong-lanceolate acute c. 10 cm. long, c. 1.70 cm. wide with petioles .30-1.30 cm. long. Peduncle c. 10.50 cm. long, rachis as long. More material is needed to establish the existence of intermediate forms. There is no difference in the structure of the flowers.

In a wood above Brastagi village, c. 4,800 feet, Carr No. 2056.
Described from dried material and flowers preserved in spirit.

Gynoglottis cymbidioides J. J. S. in Rec. Trav. Bot. Ind. neerl. I (1904) 49, t. II.

New road N.W. of Lake Toba, c. 5,000 feet, Carr No. 2023.
Endemic.

Dendrochilum brevilabre, Ridl. in Journ. Roy. As. Soc. Mal. Br. I (1923) 96.

Epiphytic on the edge of a wood on an open hill above Brastagi village, altitude c. 4,800 feet, Carr No. 2060.
Endemic.

Dendrochilum rhodobulbon, Schltr. in Engl. Bot. Jahrb. XLV (1911) Beibl. 104, 7: J. J. S. in Bull. Jard. Bot. Buit. Vol. II Suppl. (1929) t. 14, f. III.

Epiphytic with the preceding, Carr No. 2061.
Endemic.

Dendrochilum cornutum, Bl. Bijdr. 339; J. J. S. Rec. Trav. Bot. neerl. 1904, n. 1, 67; Fl. Buit. VI (Orch.) 164, Atlas No. CXXIII.

Epiphytic along the new road west of Lake Toba, altitude c. 5,000 feet, Carr No. 2043.

Distribution:—Java and Borneo.

Dendrochilum vaginatum, J. J. S. Rec. Trav. Bot. neerl. 1904, n. 1, 61; Fl. Buit. VI (Orch.) 162, Atlas No. CXXI.

Epiphytic along the road west of Lake Toba, altitude c. 5,000 feet, Carr No. 2124.

Distribution:—Java.

Dendrochilum linearifolium, Hook. f. Fl. Brit. Ind. V, 782; Ic. Pl. t. 1859; J. J. S. Rec. Trav. Bot. neerl. 1904, 75.

Epiphytic along the road west of Lake Toba, c. 5,000 feet altitude, Carr No. 2011.

Distribution:—Malay Peninsula.

Dendrochilum gracile, J. J. S. Rec. Trav. Bot. Ind. neerl. 1904, n. 1, 69; Fl. Buit. VI (Orch.) 167, Atlas No. CXXVI.

Epiphytic along the road west of Lake Toba, altitude c. 5,000 feet, Carr No. 2038 and 2042.

Distribution:—Borneo and the Malay Peninsula.

Dendrochilum basale J.J.S. in Bull. Jard Bot. Buit. Ser. 3. V. (1922) 56; I. c. II. Suppl. (1929) t. 19, f. III.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2039.
Endemic.

Dendrochilum odoratum J. J. S. in Rec. Trav. Bot. Ind. neerl. I. (1904) 29.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2052.
Distribution:—Malay Peninsula.

Dendrochilum simile Bl. Bijdr. (1825) 400; J. J. S. in Fl. Buit. VI (Orch.) 165, Atlas No. CXXIV.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2085.
Distribution:—Java, Borneo.

Dendrochilum ovatum J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. V. (1922) 47; loc. cit., II. Suppl. (1929) t. 21, f. 1.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2084.
Endemic.

Dendrochilum (*Acordidium*) **carinatum** sp. nov. Pl. 2, fig. B. Rhizoma breve, ramosum. Pseudobulbi approximati, sicco ovoidei vel oblongo-ovoidei, unifolii. Folium lineari-lanceolatum, acutum, petiolatum. Inflorescentia in pseudobulbo immaturo folio evoluto fere orta, pedunculo filiformi folium subaequante, rachide leviter flexuosa sinuosaque, 15-17-flora. Bracteae ovatae, acutae, extus furfuraceae. Sepalum dorsale ellipticum, obtusum. Sepala lateralia subfalcate

ovata, acuta. Petala e basi breviter unguiculata suborbicularia, obtusa, subfalcata. Labellum 3-lobum, intus super basin carinis 2 semihorizontalibus basi incrassatione transversa conjunctis apicem labelli attingentibus intus in lamina carinis 2 brevioribus interpositis, lobis late rotundatis. Gynostemium breve, ala apicali brevi truncata denticulata, stelidiis triangularibus superantibus.

Rhizome short, branched. *Pseudobulbs* approximate, dense, ovoid or oblong-ovoid when dry, minutely wrinkled, up to c. 1.20 cm. long, c. .40 cm. diam., 1-leaved. *Leaf* narrowly linear-lanceolate, very shortly triangular-acuminate, acute, keeled beneath with 1-2 strong nerves on each side, up to c. 6 cm. long, c. .30 cm. wide, petiole grooved c. .80 cm. long. *Inflorescence* from the apex of the immature pseudobulb with the leaf nearly expanded, c. 15-17-flowered; peduncle filiform nude, up to c. 5.50 cm. long; rachis hardly flexuous, sinuous, up to c. 3.50 cm. long, internodes c. .20 cm. long. *Bracts* ovate, acute, more than twice as long as the pedicel and ovary, appressed to the dorsal sepal, base shortly contracted, 3-nerved, highly convex furfuraceous outside, margins minutely erose, c. .30 cm. long and as broad. *Sepals* and *petals* pale flesh colour with the median nerve darker. *Dorsal sepal* elliptic, obtuse, base concealed by the bract, 3-nerved, c. .33 cm. long, c. .18 cm. wide. *Lateral sepals* adnate to the very short column foot, obliquely ovate, subacute, subfalcate, 3-nerved, c. .33 cm. long, c. .20 cm. wide. *Petals* suborbicularly dilate above the shortly clawed base, obtuse, subfalcate, 3-nerved, c. .27 cm. long, c. .22 cm. wide. *Lip* adnate to the apex of the short column foot, 3-lobed, fleshy, keels on blade 4 above the base, joined at their base by a transverse thickening, outer keels tallest roundly dilate above the base subhorizontally outwards spreading indistinctly produced to the apex of the lip, inner keels curved inwards and nearly contiguous not dilate reaching to the base of the midlobe, dark red-brown, spread out c. .25 cm. long and c. as wide across the side lobes; *side lobes* broadly rounded, entire, shortly roundly produced below the base of the lip, base erect, recurved porrect above, c. .17 cm. long from the base of the lip to the sinus of the midlobe, c. .08 cm. tall; *midlobe* semiorbicular, separated from the side lobes by a wide sinus, median keel indistinct, c. .09 cm. long. *Column* short straight, hood short tapering apex truncate irregularly toothed, including the stelidia c. .10 cm. tall, stelidia porrect, subparallel longer than the hood, subulate, fleshy, dilate in the middle, rostellum triangular apex rounded or subtruncate irregularly margined, stigma large suborbicular with elevate margins. *Column foot* very short forming an obtuse angle with the column.

A distinct small species of the section *Acoridium* readily distinguished by the curious keels of the lip.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2106.

Described from dried material and flowers preserved in spirit.

Oberonia iridifolia Lndl. Gen. & Sp. Orch. 15; J. J. S. in Fl. Buit. VI (Orch.) 239, Atlas No. CLXXV.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2010.

Distribution:—India, Tenasserim, Malay Peninsula, Borneo and Java.

Oberonia spathulata Lndl. Gen. & Sp. Orch. 16; J. J. S. in Fl. Buit. VI (Orch.) 238, Atlas No. CLXXIII.

Slopes of Gunong Baros, c. 4,800 feet, Carr No. 2103.

Distribution:—Malay Peninsula, Borneo, Java, Celebes.

Oberonia merapiensis Schltr. in Engl. Bot. Jahrb. XLV (1911) Beibl. 103, 13.

Slopes of Gunong Baros, c. 4,800 feet, Carr No. 2104.

Endemic.

Oberonia salakana J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. IX, 44, t. 4, f. III.

In a wood behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2105.

Distribution:—Java.

Microstylis sumatrensis Ridl. in Journ. R. As. Soc. Mal. Br. I (1923) 95.

Terrestrial in a wood behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2081.

Endemic.

Liparis crenulata Lndl. Gen. & Sp. Orch. 30; J. J. S. in Fl. Buit. VI. (Orch.) 269, Atlas No. CCVI.

In a wood near Brastagi village, c. 4,500 feet, Carr No. 2095.

Distribution:—Java.

Liparis foetulenta J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. II (1920) 32; l. c. II. Suppl. (1929) t. 25, f. II.

In a wood behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2082.

Endemic.

Liparis caespitosa Lndl. Bot. Reg. sub t. 882; Gen. & Sp. Orch. 32; J. J. S. in Fl. Buit. VI. (Orch.) 266, Atlas No. CCIV. *L. comosa* Ridl. in Journ. Linn. Soc. XXXII, 229; Fl. Mal. Pen. IV, 23.

On a tree in open country near Soebakti, c. 4,500 feet, Carr No. 2123.

Distribution:—Malay Peninsula, India, Borneo, Java.

Liparis angustiflora J. J. S. in Bull. Jard. Bot. Buit. Ser. 2. XXVI (1918) 31; loc. cit., Ser. 3. V, t. 35, f. VI.

Epiphytic in a wood behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2083.

Distribution:—Java.

Podochilus serpyllifolius Lndl. in Journ. Linn. Soc. Bot. III, 37; J. J. S. in Fl. Buit. VI. (Orch.) 508, Atlas No. CCCLXXXV. New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2,040. Distribution:—Java, Borneo, Philippines.

Appendicula ovalis J. J. S. in Jc. Bog. II, 57; Buit. VI (Orch.) 534, Atlas No. CDVIII. Hill forest behind the Brastagi Hotel, c. 5,000 feet, Carr No. 2005. Distribution:—Java.

Appendicula angustifolia Bl. Bijdr. 301; J. J. S. in Fl. Buit. VI (Orch.) 519, Atlas No. CCCXCIV. In a wood above Brastagi village, c. 4,800 feet, Carr No. 2054. Distribution:—Java.

Appendicula infundibuliformis J. J. S. in Jc. Bog. III, 45. In a wood behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2089. Endemic.

Appendicula (§ *Pododesme*) *inermis* sp. nov. Pl. 3. Caules pro sectione breves. Folia oblongo-elliptica, brevissime subaequaliter biloba cum mucrone minuto in sinus, basi torta, vaginis tubulosis apicem versus liberis. Inflorescentiae apicales vel laterales, laxe 20-40-florae. Bractae alternatim bifariae, triangulari-ovatae, acute apiculatae. Flores reversi. Sepala ovato-elliptica, obtusa, lateralibus falcatis. Petala e basi anguste subunguiculata oblonga, obtusa. Labellum integrum, ecallosum, ovatum, obtusum. Gynostemium breve, sub stigmate dilatatum, dorso in lobulum rotundatum triangularem producto.

Stems approximate, base very slender, internodes c. .35 cm. long, short for the section, c. 22 cm. long, not branched (? always). *Leaves* oblong-elliptic, very shortly nearly equally bilobed with a minute mucro in the sinus, base twisted, dark green edged purple with a purple midrib beneath, c. 1 cm. long, c. .50 cm. wide, sheaths tubular at the base apex free green purple when young c. .50 cm. long. *Inflorescences* terminal or lateral, elongate, branched; peduncle very slender, covered with tubular sheaths, rather flattened laterally up to c. 8 cm. long, panicles with some tubular sheaths at the base laxly 20-40-flowered, rachis warty. *Bracts* alternate, rightangularly spreading or recurved, triangular-ovate, acutely apiculate, keeled on the back, c. .16 cm. long, c. .15 cm. wide. *Flowers* reversed, sepals yellow-green suffused red-purple outside except at the apex and on the margins. *Dorsal sepal* ovate-elliptic, obtuse, 1-nerved, recurved from above the base, convex outside, concave inside, c. .25 cm. long, c. .19 cm. wide. *Lateral sepals* running to the apex of the column foot, ovate-elliptic, obtuse, falcate, subparallel, 1-nerved, convex keeled outside, concave inside, anterior margin roundly dilate at the base, c. .30 cm. long, c. .23 cm. wide. *Petals* very shortly

obliquely clawed at the base, oblong, shortly acuminate, obtuse, 1-nerved, anterior margin roundly dilate at the base, green c. .20 cm. long, c. .11 cm. wide. *Lip* adnate to the apex of the column foot with margins erect embracing it at the base, entire, without keels or calli, ovate, obtuse, 5-nerved, the outer nerves branched, concave inside, yellow-green, c. .28 cm. long, c. .26 cm. wide. *Column* short, strongly roundly dilate below the stigma with 5-7 longitudinal shallow grooves inside, back produced at the apex to a small roundly triangular obtuse lobe, purple, c. .12 cm. tall, clinandrium excavate, rostellum transversely oblong with shortly acuminate obtuse apex, stigma semilunate. *Column foot* triangular, truncate, little incurved, purple, c. .10 cm. long, adnate to the lateral sepals. Anther purple with yellow margins.

This plant is at once distinguished by the shortly obliquely clawed petals, the absence of appendages on the lip and the strongly distended column.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2121.

Described from dried material and flowers preserved in spirit.

Polystachya flavescens J. J. S. in Fl. Buit. VI (Orch.) 284, Atlas No. CCXVIII.

Medan-Brastagi road, c. 2,000 feet, Carr No. 2140.

Distribution:—Java, Borneo.

Agrostophyllum majus Hook. f. Fl. Brit. Ind. V, 824; Ic. Pl. 2096.

In a wood above Brastagi village, c. 4,800 feet, Carr No. 2062.

Distribution:—Malay Peninsula, Java.

Agrostophyllum longifolium Rehb. f. Bonpl. V, 41; J. J. S. in Fl. Buit. VI (Orch.) 290, Atlas No. CCXXII.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2125.

Distribution:—Java, Amboina.

Agrostophyllum indifferens J. J. S. in Bull. Inst. allg. Bot. Hamb. VII (1927) 44, t. VII, f. 34.

Medan-Brastagi road, c. 2,000 feet, Carr No. 2132.

Distribution:—Borneo.

Ceratostylis scariosa Ridl. in Journ. R. As. Soc. Mal. Br. I (1923) 96, Pl. 5, fig. A.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2017.

Endemic.

Ceratostylis subulata Bl. Bijdr. 306; J. J. S. in Fl. Buit. VI (Orch.) 299, Atlas No. CCXXIX.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2041.

Distribution:—Assam, Malay Peninsula, Borneo, Java.

Ceratostylis robusta Hook. f. Fl. Brit. Ind. V, 827; Ic. Pl. t. 2103.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2072.

Distribution:—Malay Peninsula.

Calanthe Caeciliae Rchb. f. in Gard. Chron. 1833, I, 432; J. J. S. in Fl. Buit. VI (Orch.) 210, Atlas No. CLVI.

Terrestrial in hill forest near Brastagi, c. 5,000 feet, Carr No. 2110.

Distribution:—Java, Malay Peninsula.

Calanthe crumenata Ridl. in Journ. F. M. S. Mus. VIII (1917) 107; J. J. S. in Bull. Jard. Bot. II. Suppl. (1929) t. 41, f. I.

Terrestrial in forest along the new road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2032.

Endemic.

Calanthe (\S *Styloglossum*) *angustifolia* Lndl. var. *sumatrana* var. nov. Pl. 4, fig. A. Rhizoma repens. Pseudobulbi distantes, breves, c. 5-6-folii. Folia linear-lanceolata, acuminata, acuta, petiolata. Inflorescentia ex axili foliorum inferiorum, erecta, pauciflora, quam foliis superioribus multo brevior. Sepalum dorsale oblongum, apice abrupte subulato-acuminatum, acutum. Sepala lateralia ovato-oblonga, apice subulato-acuminata, acuta, basi falcata. Petala e basi cuneato-unguiculata subito dilatata, late ovata vel suborbicularia, breviter subulato-acuminata, acuta. Labellum 3-lobum, calcaratum, unguiculatum, ungue marginibus gynostemio adnatis, lamina inter lobos laterales callis 2 brevibus erectis rotundatim triangularibus donata, lobis lateralibus erectis ovalibus obtusis, lobo intermedio obovato late retuso cum lobulo triangulari in sinu marginibus undulatis carinibus 3 inconspicuis e callis usque ad apicem labelli attингentibus.

Rhizome creeping, terete, rather slender, internodes up to c. 2 cm. long, a tubular membranous sheath up to c. 1.50 cm. long at each node, roots few from around the base of the pseudobulbs villous. *Pseudobulbs* up to c. 9 cm. distant but usually closer, c. .75 cm. long, covered with basal sheaths up to c. 5 cm. long, 5-6-leaved. *Leaves* linear-lanceolate, acuminate, acute, base narrowed to a petiole, beneath keeled with 1-2 strong nerves on each side, up to c. 16 cm. long, c. 1 cm. wide, petiole c. 4 cm. long. *Inflorescence* from the axil of the lower leaves, erect, few-flowered; peduncle terete with c. 3 tubular sheaths and a suberect lanceolate acute sheath near the apex, c. 8 cm. long; rachis short, rather laxly few-flowered, c. 3 cm. long; rachis short, rather laxly few-flowered, c. 3 cm. long. Bracts caducous, ovate-lanceolate, acute. *Flowers* not well expanded, sepals and petals white. *Dorsal sepal* oblong, apex abruptly subulate-acuminate, acute, 3-5-nerved, c. .90 cm. long, c. .53 cm. wide. *Lateral sepals* ovate-oblong, rather long subulate-acuminate, acute, base slightly falcate with the anterior margin dilate at the base and embracing the mouth of the spur, 3-5-nerved, keeled outside, grooved inside, c. 1.02 cm. long, c. .48 cm. wide. *Petals* shortly cuneately clawed at the base, blade abruptly dilate broadly ovate or suborbicular, shortly subulate-acuminate, acute, 3-nerved with the outer

nerves branched, grooved inside and outside, c. .95 cm. long, c. .63 cm. wide. *Lip* 3-lobed, spurred, clawed, margins of claw adnate to the sides of the column forming a slightly laterally flattened tube c. .28 cm. long, 2 short erect roundly triangular obtuse yellow calli on the blade between the side lobes, white, spread out from the tip of the spur to the apex of the midlobe c. 1.68 cm. long, c. .69 cm. wide across the side lobes; *side lobes* erect, oval, obtuse, anterior margin nearly straight, posterior margin with a short tooth at the base, 2-nerved, yellow, c. .19 cm. tall, c. .15 cm. wide; *midlobe* obovate, retuse with a short triangular subacute lobule in the sinus, keels 3 inconspicuous from the calli to the apex of the lip, margins undulate, c. .55 cm. long, c. .67 cm. wide; *spur* forming an acute angle with the ovary, slightly narrowed above the base then dilate to the broadly rounded apex, keeled on the dilate sides, flattened and keeled beneath, c. .67 cm. long, c. .34 cm. wide. *Column* with margins adnate to the claw of the lip, slightly dilate towards the truncate entire apex, broadly keeled on the back, white, c. .40 cm. tall, clinandrium deeply excavate suborbicular with entire margins, rostellum triangular acuminate very acute keeled inside, stigma narrowly semilunate. *Anther* triangular-ovate, subacute, base very shortly bilobed, keeled on the back, white, c. .20 cm. long, linear-ob lanceolate disc c. .12 cm. long.

This differs from the type principally in the dwarf state of the plant, much resembling *C. pusilla* Carr from the Malay Peninsula in the more distinctly subulate-acuminate sepals and petals, the side lobes of the lip which are oval and longer than broad, the shorter spur and the broadly obovate midlobe with undulate margins and a distinct lobule in the apical sinus.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2116.

Described from dried material and flowers preserved in spirit.

Calanthe (§ Styloglossum) epiphytica sp. nov. Pl. 4, fig. B.
Rhizoma breve. Pseudobulbi approximati, 5-7-foli. Folia linear-lanceolata, acuminata, acutissima, basi petiolata. Inflorescentia ex axili foliorum inferiorum, erecta, apicil dense multiflora. Bracteae caducae, triangulari-ovatae, acuminatae, acutae. Sepalum dorsale oblongo-obovatum, breviter triangulari-acuminatum, acutum. Sepala lateralia oblongo-obovata, breviter acute apiculata. Petala e basi breviter unguiculata elliptica, acuta. Labellum 3-lobum, calcaratum, unguiculatum ungue marginibus gynostemio adnatis, callis 2 humilibus triangularibus inter lobos laterales usque ad medium lobi intermedii inconspicue productis, lobis lateralibus erectis oblongis obtusis, lobo intermedio breviter lateque obcordato dente minuto in sinu, calcare brevi clavato canaliculato. Gynostemium apicem versus leviter dilatato, clinandrio excavato, rostello 0.

Rhizome short. *Pseudobulbs* approximate, c. 3 cm. long, covered with ribbed sheaths c. 7 cm. long, c. 5-7-leaved. *Leaves* linear-lanceolate, acuminate, very acute, keeled beneath with c. 3 strong

nerves on each side, c. 45 cm. long, c. 4.50 cm. wide, base narrowed to a petiole up to c. 16 cm. long. *Inflorescence* from the axil of the lower leaves, erect, very densely many-flowered, peduncle stout terete with c. 3 loose imbricating sheaths at the base and c. 5 loose tubular membranous sheaths above, 7-20 cm. long, rachis c. 5 cm. long forming a very dense conic head. *Bracts* caducous, lower ones largest triangular-ovate, acuminate, acute, 7-9-nerved, c. 3.70 cm. long, c. 1.75 cm. wide. *Flowers* not well expanded, white, calli of lip yellow. *Dorsal sepal* oblong-obovate, shortly triangular-acuminate, acute, 5-nerved, c. 1.23 cm. long, c. .68 cm. wide. *Lateral sepals* oblong-obovate, shortly acutely apiculate, 5-nerved, anterior margin slightly dilate at the base and embracing the mouth of the spur, c. 1.27 cm. long, c. .65 cm. wide. *Petals* shortly subcuneately clawed at the base, blade rather abruptly dilate elliptic, acute, 5-nerved with the outer nerves branched, grooved inside and outside, c. 1.25 cm. long, c. .72 cm. wide. *Lip* 3-lobed, spurred, clawed, margins of claw adnate to the sides of the column for c. .50 cm. and forming a laterally flattened tube, grooved beneath for the whole length, calli 2 on the blade between the side lobes low triangular obtuse produced as inconspicuous keels to about the middle of the midlobe, spread out c. 1.80 cm. long from the tip of the spur to the apex of the midlobe, c. 1 cm. wide across the side lobes; *side lobes* erect, roundly oblong, obtuse, c. .22 cm. tall; *midlobe* very shortly and broadly obovate with a minute tooth in the sinus, lobules broadly rounded, c. .45 cm. long, c. .90 cm. wide; *spur* short, clubbed, retuse, subparallel to the ovary, apex a little recurved and appressed to the ovary, grooved in front and on the back towards the tip, slightly flattened on the back, sides dilate with an oblique keel, c. .50 cm. long. *Column* adnate to the claw of the lip, little dilate towards the apex, concave inside, rounded on the back, c. .60 cm. tall, clinandrium excavate suborbicular rostellum 0, stigma elevate semilunate grooved in the middle resembling 2 oblique tubercles. *Anther* broadly ovate, very shortly acuminate, acute. *Pollinia* 8, pyriform.

This interesting epiphytic species belongs to the affinity of *C. angustifolia* Lndl. and *C. truncicola* Schltr. to which latter it is nearest. From *C. angustifolia* Lndl. it differs in the broader leaves, the very densely many-flowered rachis, the much reduced calli on the blade of the lip and the absence of a tooth at the base of the posterior margin of the side lobes. From *C. truncicola* Schltr. it is distinguished by the shorter spur, the much broader midlobe, almost as broad as the width across the side lobes and by the colour of the flowers.

Gunong Baros, c. 6,000 feet altitude, epiphytic on trunks and branches of moss-grown trees, Carr No. 2115.

Described from dried material and flowers preserved in spirit.

Calanthe rigida Carr var. *gracilis* var. nov. Pl. 4, fig. C. A planta typica habitu graciliore foliis angustioribus floribus minoribus calcariore differt.

This plant differs from the type in the more slender habit, the narrower leaves, smaller flowers and more slender spur.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2029.
Distribution of the type:—Malay Peninsula.

Phaius Incarvillei O. K. Rev. Gen. Pl. II, 675; J. J. S. in Fl. Buit. VI (Orch.) 194, Atlas No. CXLV.

Terrestrial in open country around Brastagi, c. 4,600 feet, Carr No. 2091.

Distribution:—Malay Peninsula, Java.

Spathoglottis aurea Lndl. Paxt. Fl. Gard. I, 16; J. J. S. in Fl. Buit. VI (Orch.) 218, Atlas No. CLXI.

Terrestrial in road cuttings near Kaban Djahe, c. 4,500 feet, Carr No. 2013.

Distribution:—Malay Peninsula, Borneo, Java.

Spathoglottis plicata Bl. Bijdr. 401, t. 76; J. J. S. in Fl. Buit. VI (Orch.) 219, Atlas No. CLXII.

Terrestrial in open country around Brastagi, c. 4,800 feet, Carr No. 2138.

Distribution:—Malay Peninsula, Borneo, Java, Celebes, Moluccas, New Guinea, Solomon Is. etc.

Trichotosia velutina Krzl. in Engl. Pflanzenr. IV. 50. H. B. 21, p. 140.

Soebakti, c. 4,600 feet, Carr No. 2051.

Distribution:—Malay Peninsula, Borneo, Java.

Trichotosia ferox Bl. Bijdr. 342; *Eria ferox* Bl. Mus. II, 184; J. J. S. in Fl. Buit. VI (Orch.) 383, Atlas No. CCXC.

In a wood above Brastagi village, c. 4,800 feet, Carr No. 2053.

Distribution:—Malay Peninsula, Borneo, Java.

Eria aeuminata Lndl. Gen. & Sp. Orch. 69; J. J. S. in Bull. Dep. Agr. Ind. neerl. XII (1907) 34; Bull. Jard. Bot. Buit. Sér. 3. VI, t. 3, f. III.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2034.

Distribution:—Java.

Eria monostachya Lndl. in Journ. Linn. Soc. III (1859) 56; J. J. S. in Fl. Buit. VI (Orch.) 395, Atlas No. CCXCIX.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2071.

Distribution:—Java.

Eria oblitterata Rchb. f. Bonpl. V (1857) 55; J. J. S. in Fl. Buit. VI (Orch.) 391, Atlas No. CCXCVI.

Above Baros Djahe, c. 5,500 feet, Carr No. 2112.

Distribution:—Java.

Eria floribunda Lndl. Wall. Cat. n. 7408; J. J. S. in Fl. Buit. VI (Orch.) 400, Atlas No. CCCIII.

Hill forest behind the Brastagi Hotel, c. 5,000 feet, Carr No. 2002, 2009.

Distribution:—Malay Peninsula, Borneo, Java.

Eria oberoniiflora J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, 11 (1920) 52; loc. cit., II, Suppl. (1929) t. 50, f. IV.

Woods behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2050. Endemic.

Eria appendiculata Lndl. Gen. & Sp. Orch. 69; J. J. S. in Fl. Buit. VI (Orch.) 408, Atlas No. CCCX.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2016.

Distribution:—Java.

Eria flavescens Lndl. Gen. & Sp. Orch. 66; J. J. S. in Fl. Buit. VI (Orch.) 408, Atlas No. CCCXI.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2027.

This species is very variable both in the dimensions of pseudo-bulbs and leaves and in the keels of the lip. The outer keels are sometimes double with the carunculate cushion on the midlobe often split into 5-7 distinct carunculate keels. The size and colour markings of the flowers also show much variation.

Distribution:—Java.

Eria hyacinthoides Lndl. Gen. & Sp. Orch. 66; J. J. S. in Fl. Buit. VI (Orch.) 410, Atlas No. CCCXII.

In a wood behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2126.

Distribution:—Malay Peninsula, Borneo, Java.

Eria cyrtosepala Schltr. in Engl. Bot. Jahrb. XLV (1911) Beibl. 104, 37.

Soebakti, terrestrial on the vertical walls of a deep ravine, c. 4,500 feet, Carr No. 2045.

Endemic.

Eria albidotomentosa Lndl. Gen. & Sp. Orch. 66; J. J. S. in Fl. Buit. VI (Orch.) 382, Atlas No. CCLXXXIX.

Near Piso Piso in open country above Lake Toba terrestrial beneath bushes, c. 4,500 feet, Carr No. 2046 and 2047. No. 2047, of which several plants were seen, is peloric and may be designated **var. pelor** Carr. There is no column foot so that the sepals are all equal. The lip is petaloid, being exactly the same as the other petals both in structure and dimensions. The column supports 3 anthers, the lateral anthers being borne on each side of the stigma so that self-pollination invariably results. The normal plants grew side by side with the peloric ones and under exactly the same conditions.

Distribution:—Siam, Malay Peninsula, Java.

Dendrobium deliense Schltr. in Fedde Repert. XI (1912) 143.

Hill forest behind the Brastagi Hotel, c. 5,000 feet, Carr No. 2003.
Endemic.

Dendrobium cuneatipetalum J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. IX, 156.

On a tree in open country near Soebakti, c. 4,600 feet, Carr No. 2048.
Endemic.

Dendrobium pumilum Roxb. var. **enotatum** var. nov. A planta typica statura robustiore, foliis crassioribus, floribus majoribus labello apici profunde bilobo differt, colore flavis enotatis.

This variety differs from the typical plant in the stouter proportions, more fleshy leaves and larger plain yellow flowers without any purple markings and a lip deeply incised at the apex. It has been grown for more than a year in the Singapore Botanic Gardens and throughout this period the flowering has not coincided with that of the typical plants.

Baros Djahe on a tree by the side of the road, c. 4,500 feet, Carr No. 2134.

Distribution of type:—Burma, Malay Peninsula, Borneo, Java.

Dendrobium linearifolium T. & B. Tijdschr. Ned. XXIV, 318: J. J. S. in Fl. Buit. VI (Orch.) 327, Atlas No. CCXLVI.

On a tree in open country near Soebakti, c. 4,600 feet, Carr No. 2135.

Distribution:—Java.

Dendrobium barisanum J. J. S. in Bull. Jard. Bot. Buit. Ser. 2. XXV (1917) 45.

Medan-Brastagi road, c. 3,500 feet, Carr No. 2024, growing on an old stump by the side of the road.

Endemic.

Dendrobium pedicellatum J. J. S. in Bull. Dep. Agr. Ind. neerl. XV (1908) 13.

The colour of the sepals ranges from pure white to bright rose-lilac while there are often 1 or 2 crimson spots superimposed upon the median yellow spot on the lip. It is a common plant in the Kaban Djahe and Toba districts.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2009 and 2033. Hill forest behind the Brastagi Hotel, c. 5,000 feet, Carr No. 2088.

Endemic.

Dendrobium malvicolor Ridl. in Journ. F. M. S. Mus. VIII (1917) 90. Pl. 5, fig. B.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2036, not uncommon.

Endemic.

Dendrobium heterocarpum Wall. Lndl. Gen. & Sp. Orch. 78; J. J. S. in Fl. Buit. VI (Orch.) 368, Atlas No. CCLXXXI.
Hills behind the Brastagi Hotel, c. 5,000 feet, Carr No. 2092.
Distribution:—India, Burma, Malay Peninsula, Java.

Desmotrichum angustifolium Bl. Bijdr. 330: *Dendrobium angustifolium* Lndl. Gen. & Sp. Orch. 76; J. J. S. in Fl. Buit. VI (Orch.) 322, Atlas No. CCXLIII.
Medan-Brastagi road, c. 2,000 feet, Carr No. 2131.
Distribution:—Malay Peninsula, Java.

Desmotrichum trifurcatum sp. nov. Pl. 6, fig. A. Rhizoma longe repens, ramosum. Caules erecti, ramosissimi. Pseudobulbi fusiformes, 1-folii. Foliolum lanceolatum vel oblongo-lanceolatum, brevissime aequaliter bilobula, petiolata. Inflorescentiae breves, 1-florae. Sepalum dorsale oblongo-ovatum, obtuse apiculatum. Sepala lateralia ovata, obtuse apiculata, mento oblongo breviter acuminato obtuso. Petala oblongo-lanceolata, obtusa. Labellum 3-lobum, lamina in carinam latam apicem versus trifurcatam conspicue elevata, lobis lateralibus rotundatim triangularibus, lobo intermedio subquadrato bilobo dente minuto in sinu. Gynostemium conicum, brachiis dentiformibus recurvis.

Rhizome long-creeping, branched, densely rooting, up to c. .50 cm. diam., internodes .10-.40 cm. long. Stems c. 1.50-2.50 cm. distant, erect, much branched, up to c. 27 cm. tall, c. .27 cm. diam., at first clothed with membranous sheaths, internodes up to c. 3.40 cm. long, olive green tinted red. Pseudobulbs fusiform, red, sometimes olive green, lower ones largest c. 3.50 cm. long, c. 1 cm. diam., 1-leaved. Leaf lanceolate or oblong-lanceolate, very shortly equally bilobed, not petiolate, grooved dark green above, keeled paler beneath, base twisted, c. c. 7 cm. long, c. 1.20 cm. wide. Inflorescences from the apex of the pseudobulb behind the leaf, very short, 1-flowered, peduncle terete up to c. .60 cm. long clothed with some imbricating sheaths. Flower rather large, sepals and petals pale yellow more or less veined and suffused red-purple, the sepals scurfy outside. Dorsal sepal oblong-ovate, obtusely apiculate, 5-nerved, c. .70 cm. long, c. .42 cm. wide. Lateral sepals broadly ovate, obtusely apiculate, 7-nerved, c. .70 cm. long, c. .75 cm. wide, mentum oblong shortly acuminate obtuse c. 1.50 cm. long. Petals oblong-lanceolate, obtuse, 3-nerved, c. .70 cm. long, c. .20 cm. wide. Lip adnate to the apex of the column foot, 3-lobed, spread out c. 2.20 cm. long, c. 1.05 cm. wide across the side lobes, blade pale yellow suffused red-purple along the median line beneath, a broad pale yellow keel between the side lobes from above the base of the lip to the base of the midlobe, branching into 3 from about the middle with the median branch often suffused red-purple; side lobes erect, roundly triangular, obtuse, anterior margin erose, pale yellow sometimes tipped red-purple, posterior margin c. 1.50 cm. long, anterior margin c. .27 cm.

long; *midlobe subquadrate*, apex bilobed to c. the middle with a short tooth in the narrow sinus, warty and wrinkled in the lower $\frac{1}{3}$, margins shortly erose, base yellow more or less suffused red-purple, apical lobules falcately oblong obtuse red-purple, in all c. .80 cm. long, c. .95 cm. wide. *Column* conic, pale greenish yellow, c. .16 cm. tall, arms minute tooth-like recurved pale green, clinandrium conic-excavate transversely oblong, rostellum short rounded, stigma large excavate suborbicular. Anther conic, flattened in front, beak very short broad retuse, c. .17 cm. tall, c. .20 cm. wide, cream. *Column foot* linear, slightly incurved, pale greenish yellow, c. 1.65 cm. long, c. .30 cm. wide. *Ovary* 6-grooved, furfuraceous, pedicel terete c. .30 cm. long.

This plant is undoubtedly a close ally of *D. grandiflorum* Bl. from Java. It differs, however, in the very shortly bilobed leaves, the narrower sepals and petals and smaller lip with narrower sinus between the apical lobules with a triangular tooth. The colour of the flowers is quite different.

Slopes of Gunong Baros, c. 5,000 feet, Carr No. 2099.

Described from dried material and flowers in spirit.

Sarcopodium cymbidioides Krzl. var. **humile** var. nov.
Pseudobulbi c. 1.50 cm. distantes, ovoidei, plus minusve quadrangulati, c. 1.40 cm. longi, c. 1 cm. lati, bifoli. *Folia* brevissima, oblonga ovatae, breviter inaequaliter biloba, c. 1.90 cm. longa, c. 1.20 cm. lata. *Inflorescentia* una, brevis, uniflora, pedunculo gracili c. 3.50 cm. longo. *Flores* eis plantae typicae similes sed sepalis petalique minoribus.

Rhizome creeping, branched, densely covered with imbricating sheaths. *Pseudobulbs* c. 1.50 cm. apart, erect or forming an acute angle with the rhizome, ovoid, more or less four-angled, wrinkled, c. 1.40 cm. long, c. 1 cm. diam., 2-leaved. *Leaves* very small, oblong or ovate, shortly unequally bilobed, grooved above, keeled beneath, margins thickened, c. 1.90 cm. long, c. 1.20 cm. wide, base twisted, petiole grooved c. .30 cm. long. *Inflorescence* single from the apex of the pseudobulb between the leaves, short, 1-flowered, peduncle erect slender terete with some tubular sheaths at the base and one near the middle c. 3.50 cm. long. *Flowers* similar to those of the type but sepals and petals smaller.

New road N. W. of Lake Toba, c. 5,000 feet, not uncommon, Carr No. 2015.

Distribution of type:—Java.

Sarcopodium verruciferum Rolfe var. **pauciflorum** var. nov. A planta typica foliis linearibus vel lineari-lanceolatis et inflorescentia brevi pauciflora floribus c. 3 differt.

This variety differs from the typical plant in the linear or linear-lanceolate leaves up to c. 11.50 cm. long c. .90 cm. wide and the shorter c. 3-flowered inflorescences with the peduncle up to c. 3 cm. long and rachis c. 2 cm. long.

As Dr. J. J. Smith points out, in Bull. Jard. Bot. Buit. Ser. 2, II, 68 under his description of *Dendrobium dempoense*, *Sarcopodium verruciferum* Rolfe (*Dendrobium verruciferum* J. J. S. not Rchb. f.), *S. laurifolium* Krzl. and *S. Wickersii* (Schltr.) Carr are possibly synonymous.

S. verruciferum Rolfe var. *pauciflorum* Carr differs from *S. pulchellum* Ridl. only in the longer narrower leaves and the 3-flowered inflorescence. The structure of the flowers is identical in every detail and I have no doubt that *S. pulchellum* Ridl. should not be retained but should be considered as *S. verruciferum* Rolfe var. *pulchellum* Carr. It is merely an extremely reduced state of the species just as *S. Wickersii* Carr represents possibly the other extreme.

S. dempoense (J. J. S.) Carr appears from the size and structure of the flowers to be sufficiently distinct.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2025.

Distribution of the type:—Borneo.

Bulbophyllum ovalifolium Ldl. Gen. & Sp. Orch. 49; J. J. S. in Fl. Buit. VI (Orch.) 455, Atlas No. CCCXLVII.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2018, 2069.

Distribution:—Malay Peninsula, Java.

Bulbophyllum (§ *Monilibulbum*) **remiferum** sp. nov. Pl. 7, fig. A. Rhizoma repens, ramosum. Pseudobulbi approximati, monili-formes, supra visi ovati vel suborbicularis, basi rhizomati adnati apicem versus recurvi subtus canaliculati, unifolii. Folium lanceolatum vel ovato-lanceolatum, acutum, basi tortum et breviter petiolatum, carnosum. Inflorescentiae e basi pseudobulbi, folium subae-quantes, 1-florae. Bractea infundibuliformis. Sepalum dorsale oblongo-lanceolatum, acuminatum, acute apiculatum. Sepala lateralia multo longiora, e basi oblongo-ovata longe acuminata, conico-apicu-lata, parte acuminata sensim spathulatim dilatata. Petala parva, e basi lineariter unguiculata spathulatim dilatata, obtusissima. Labellum integrum, oblongum, basi concavum marginibus erectis, super basin valde convexum verrucosum marginibus recurvis et apicem versus contiguis. Gynostemium breve, stelidiis porrectis subulatis, pede sub stigmate in concretionem conicam elevato.

Rhizome creeping; branched, rooting from beneath the pseudobulbs. Pseudobulbs approximate, moniliform, seen from above ovate or suborbicular, base prostrate adnate to the rhizome, apex recurved grooved beneath, minutely wrinkled, c. .50 cm. long, c. .40 cm. diam., 1-leaved. Leaf lanceolate or ovate-lanceolate, acute, fleshy, grooved above, keeled beneath, c. 1.20 cm. long, c. .40 cm. wide, petiole twisted grooved c. .07 cm. long. Inflorescences from below the pseudobulb, erect, 1-flowered, peduncle filiform with some tubular sheaths at the base c. 1.30 cm. long. Bract infundibuliform, c. .20

cm. long. *Dorsal sepal* oblong-lanceolate, acuminate, acutely apiculate, 3-nerved with the outer nerves branched above the base, concave inside, convex outside with elevate nerves, ochre-yellow with darker nerves, c. .58 cm. long, c. .25 cm. wide. *Lateral sepals* adnate to the column foot to beyond the middle, subsigmoidly falcate, basal third oblong-ovate, above long linear-acuminate, concave inside, fleshy, distinctly spathulately dilate towards the conic-apiculate very fleshy apex, 3-nerved with the outer nerves branched above the base, nerves elevate outside, bright ochre-yellow with darker nerves, c. 1.40 cm. long, c. .30 cm. wide. *Petals* clawed to c. the middle, claw linear, spathulately dilate above the middle, very obtuse, 1-nerved, yellow, c. .17 cm. long, c. .12 cm. wide. *Lip* adnate to the apex of the column foot, mobile, entire, oblong, obtuse, base concave with erect margins, above highly convex papillose and warty with margins recurved and contiguous at the apex, dark red, c. .23 cm. long. *Column* little dilate in the middle, pale yellow, including the porrect subulate stelidia c. .13 cm. long, foot forming a right angle with the column incurved towards the apex with a conic swelling at the base below the stigma, c. .10 cm. long. *Ovary* 6-grooved, furfuraceous, c. .10 cm. long, pedicel terete c. 1 cm. long.

An ally of *B. ovalifolium* Lindl. but very distinct by reason of the long oar-shaped lateral sepals from which the specific name is taken and the spathulate petals.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2022.

Described from a plant preserved in spirit.

Bulbophyllum Tapirus J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, X, 64. Pl. 6, fig. B.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2020.
Endemic.

Bulbophyllum (§ *Monilibulbum*) **connatum** sp. nov. Pl. 7, fig. B. Rhizoma breve, pauciramosum. Pseudobulbi approximati, supra visi ovati vel oblongo-ovati, dimidio basali rhizomati adnati, dimidio apicali recurvi subtus canaliculati, 1-folii. Folium lineari-lanceolatum vel lineari-ob lanceolatum, acutum vel acute apiculatum, carnosum, basi breviter petiolatum. Inflorescentiae e basi pseudobulbi, 2-3 fasciculatae, 1-florae. Sepalum dorsale e basi elliptica longe subulato-acuminatum, acutissimum. Sepala lateralia marginibus anticis omnino fere connatis, apici tantum libera, laminam ovatam longe subulato-acuminatam bifidam formantia. Petala oblonga, obtusa. Labellum e basi breviter unguiculata obovatum, obtusum, dimidio superiore verrucosum.

Rhizome short, few-branched, rooting from below the pseudobulbs. Pseudobulbs approximate, seen from above ovate or oblong-ovate, basal half prostrate adnate to the rhizome, apical half recurved grooved beneath, minutely wrinkled, up to c. 1.50 cm. long, c. .75 cm. diam., 1-leaved. Leaf linear-lanceolate or linear-ob lanceolate, acute or acutely apiculate, fleshy, grooved above, keeled beneath,

rather densely covered (?) always with minute black tubercles bearing a tuft of short black bristles, green, up to c. 6.30 cm. long, c. .93 cm. wide, petiole grooved slightly twisted c. .20 cm. long. *Inflorescences* 2-3 from the base of the pseudobulb, fascicled, erect, 1-flowered; peduncle rather stout for the section, terete, base covered with some tubular sheaths, a little dilate upwards, up to c. 5.50 cm. long. *Bract* tubular, apex free acute keeled on the back, densely papillose, c. .60 cm. long. *Flowers* well expanded, sepals bright yellow-green tinted orange towards the base. *Dorsal sepal* elliptic, long subulate-acuminate, very acute, 5-nerved with the outer nerves branched, concave inside, outside convex with the nerves elevate and papillose in the basal $\frac{1}{4}$ with a strong median keel to the apex, up to c. 4.75 cm. long, c. .65 cm. wide. *Lateral sepals* hardly running down the column foot, 5-nerved with the outer nerves branched, outside convex with the nerves elevate and papillose towards the base, anterior margins connate for almost the whole length with the apex only free forming an ovate long subulate-acuminate bifid blade with a median keel inside, up to c. 4.75 cm. long, c. 1.28 cm. wide. *Petals* oblong, obtuse, 1-nerved, base little dilate, pale yellow with a median red streak and a shorter one on each side in the upper half, c. .30 cm. long, c. .09 cm. wide. *Lip* adnate to the apex of the column foot, mobile, entire, base shortly cuneately clawed, obovate, obtuse, above the base fleshy grooved with erect margins, broadly keeled convex sparsely warty in the upper half with the margins recurved and undulate, apex shortly recurved, crimson, spread out c. .42 cm. long, c. .33 cm. wide. *Column* conic, yellow, c. .08 cm. long, stelidia subs-gmoid erecto-patent parallel subulate c. .12 cm. long, stigma small suborbicular. Anther conic, laterally flattened with a conic papillose boss, base bilobed, pale yellow-green, c. .05 cm. tall. *Column foot* almost entirely free, apex a little incurved, sides grooved, apex very shortly bilobed fleshy, a low conic swelling inside at the base, reddish, c. .15 cm. long.

This is nearest to *B. longistelidium* Ridl. from the Malay Peninsula, the leaves of which species are usually furnished with minute black bristle-bearing tubercles though this is not invariably the case. *B. connatum* Carr is a very distinct plant and the only member of the section *Monilibulbum* known to me with the lateral sepals connate into an ovate long-acuminate blade.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2065.

Described from dried material and plants preserved in spirit.

Bulbophyllum violaceum Lndl. Gen. & Sp. Orch. 50; J. J. S. in Fl. Buit. VI (Orch.) 460, Atlas No. CCCLII.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2077.

Distribution:—Java.

Bulbophyllum brastagiense sp. nov. Pl. 8, fig. A. Rhizoma breve, pauciramosum. Pseudobulbi erecti vel suberecti, ovoidei, 1-folii. Folium lanceolatum vel lineari-lanceolatum, acutum. Inflores-

centiae fasciculatae, erectae, 1-florae. Bractea infundibuliformis. Sepalum dorsale lanceolatum, apiculatum, marginibus ciliolatis. Sepala lateralia oblonga, acute apiculata, marginibus ciliolatis, margine antico basi paulo triangulariter dilatato. Petala parva, ovato-oblonga vel triangular-ovata, obtusissima, ciliolata, intus apicem versus papillosa. Labelum inconspicue 3-lobum, intus inter lobos laterales carinis 2 humilibus marginibus labelli parallelibus, lobis lateralibus inconspicuis rotundatis erectis marginibus basi in lobum parvum papillosum productis, lobo intermedio oblongo-lanceolato obtuso intus concavo.

Rhizome short, few-branched, covered with dry sheaths, rather stout. *Pseudobulbs* up to c. 1.50 cm. distant, erect or suberect, narrowly ovoid with c. 4 longitudinal grooves, red, c. 1.70 cm. tall, c. .80 cm. diam., 1-leaved. *Leaf* lanceolate or linear-lanceolate, acute, grooved above, keeled beneath, base narrowed and twisted to the very short petiole, green sometimes suffused red especially towards the base, 3.80-6 cm. long, .60-1 cm. wide, petiole grooved c. .10 cm. long. *Inflorescences* from the rhizome at the base of the pseudobulb, 6 or more, fascicled, erect, 1-flowered, peduncle filiform with some tubular sheaths at the base c. 4.25 cm. long. *Bract* infundibuliform, apex shortly free keeled, c. .25 cm. long. *Sepals* semitransparently yellow-green with 3 dark red nerves and mottled dark red outside. *Dorsal sepal* lanceolate, apiculate, 3-nerved, margins ciliolate from above the base, convex outside with nerves a little elevate, .90-1.10 cm. long, c. .37 cm. wide. *Lateral sepals* very shortly adnate to the column foot, oblong, acutely apiculate, 3-nerved, margins ciliolate from above the base, anterior margin shortly triangular-dilate at the base, convex outside with the nerves a little elevate, .90-1.10 cm. long, c. .37 cm. wide. *Petals* ovate-oblong or triangular-ovate, shortly acuminate, very obtuse, 1-nerved, inside papillose towards the apex, margins minutely ciliolate from above the base, transparently pale greenish with c. 5 black dots around the margin towards the apex, c. .30 cm. long, c. .25 cm. wide. *Lip* adnate to the apex of the column foot, inconspicuously 3-lobed, blade fleshy with 2 low keels between the side lobes near to and parallel to the margins, margins produced at the base to a short rounded lobe, ochre-yellow dotted red-brown, c. .70 cm. long, c. .30 cm. wide, *side lobes* erect very short rounded, sides papillose outside towards the base, *midlobe* oblong-lanceolate obtuse c. 5-nerved concave inside with erect margins. *Column* short, pale yellow, c. .15 cm. long, stelidia very slender subulate c. .15 cm. long, a low conic swelling below the stigma, foot oblong forming an obtuse angle with the column apex dilate c. .30 cm. long.

This plant is of the affinity of *B. violaceum* Ldl., *B. tenuifolium* Ldl., *B. hydrophilum* J. J. S., *B. pan* Ridl., *B. crassinervium* J. J. S., *B. luteopurpureum* J. J. S. and *B. angulatum* J. J. S. all hitherto included in the rather heterogeneous section *Micromonanthe*. It appears to me, however, that they would be best included under a

special section for which I propose the name **Megaloglossum**. The distinctive characters of the section are the comparatively large not prostrate pseudobulbs which are ovoid and more or less 4-sided or laterally grooved, the broad petals, the comparatively large lip, the long slender stelidia of the column and the dilate apex of the column foot.

In a wood behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2021.

Described from dried material and a plant preserved in spirit.

Bulbophyllum (*§ Micromananthe*) **filovagans** sp. nov. Pl. 8, fig. B. Rhizoma longe repens, gracillimum. Pseudobulbi distantes, erecti suberective, ovoidei, multisulcati, 1-folii. Folium vel lanceolatum vel ovatum vel oblongo-ovatum, breviter mucronatum. Inflorescentiae breves, 1-florae, pedunculo brevi filiformi. Sepala anguste triangulari-ovata, sensim acuminata, acuta, lateralibus valde falcatis. Petala oblonga, longiuscule acuminata, acuta. Labelium 3-lobum, unguiculatum, ungue oblongo, carina media e basi usque ad apicem donatum, lobis lateralibus parvis erectis carnis triangularibus obtusis reversis, lobo intermedio oblongo obtuso.

Rhizome long-creeping, much branched, very slender, internodes up to c. 1.20 cm. long, roots 1-3 from beneath each pseudobulb short slender glabrous. *Pseudobulbs* up to c. 3.50 cm. distant, suberect with the apex often recurved, ovoid, many-grooved with a broad groove on the underside towards the base, dilate over the rhizome on each side at the base, up to c. .58 cm. tall, c. .30 cm. diam., 1-leaved. *Leaf* lanceolate, ovate or oblong-ovate, shortly mucronate, grooved above, keeled beneath, base twisted to the petiole, sometimes rather fleshy, 1-2.20 cm. long, .22-.58 cm. wide, petiole grooved .05-.10cm. long. *Inflorescences* from the rhizome below the pseudobulbs or from the nodes, very short, 1-flowered, peduncle filiform with some tubular sheaths at the base .40-.90 cm. long. *Bract* infundibuliform with broadly free apex, c. .07 cm. long. *Flowers* not well expanded, *sepals* and *petals* whitish with red nerves and suffused red down the middle, sepals triangular-ovate, distinctly acuminate acute 3-nerved the laterals strongly falcate and adnate to the column foot to its apex, dorsal sepal c. .55 cm. long c. .18 cm. wide, laterals c. .50 cm. long c. .23 cm. wide. *Petals* oblong, rather long-acuminated, acute, 1-3-nerved, c. .36 cm. long, c. .10 cm. wide. *Lip* adnate to the apex of the column foot, 3-lobed, clawed, glabrous, 3-nerved, keeled inside for the whole length with the keel more conspicuous on the midlobe with an elevate nerve on each side, dark red, spread out c. .30 cm. long, c. .09 cm. wide, claw c. .05 cm. long; *side lobes* erect, triangular, obtuse, apex pointing backwards, fleshy; *midlobe* oblong, obtuse, convex above. *Column* conic, white, c. .09 cm. tall, stelidia erect sigmoid subulate c. .10 cm. long. *Column foot* roundly incurved, red, c. .15 cm. long.

A distinct species characterised by the comparatively large oblong acuminate acute petals and the 3-lobed clawed glabrous lip rather resembling in structure some of the species of the section *Polyblepharon*.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2066.

Described from dried material and a plant preserved in spirit.

Bulbophyllum diminutum J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, IX, 176. Pl. 10, fig. B.

Slopes of Gunong Baros, c. 5,000 feet, Carr No. 2097.

Endemic.

Bulbophyllum salaccense Rchb. f. Bonpl. V (1857) 57; J. J. S. in Fl. Buit. VI (Orch.) 430, Atlas No. CCCXXV.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2139.

Distribution:—Malay Peninsula, Java.

Bulbophyllum (§ *Desmosanthes*) **longivagans** sp. nov. Pl. 9, fig. A. Rhizoma longe vagans, gracile, pauciramosum. Pseudobulbi ad c. 10 cm. remoti, late ovoidei, 1-folii. Folium oblongum vel oblongo-ovatum, brevissime rotundatum bilobulum, coriaceum, petiolo breve canaliculato cuneato. Inflorescentiae e nodis caulinum, breves, c. 4-florae. Bracteae ovatae, acuminatae, acutae, quam ovario cum pedicello paulo longiores. Sepalum dorsale oblongum, breviter acuminatum, apici carnosum acutum marginibus incurvis. Sepala lateralia ovato-lanceolata, acuminata, apici carnosum acutum marginibus incurvis. Petala anguste elliptica, obtusa. Labellum integrum, carnosum, ovatum, apice convexo obtuso, carinis 2 validis e basi sub apice evanescentibus. Gynostemium latum, stelidiis triangularibus acuminatis acutissimis, stigmate magno ovali.

Rhizome long rambling, slender, closely appressed to the substratum, few-branched, rooting sparingly from the nodes and densely from beneath the pseudobulbs, at first covered with sheaths, c. .12 cm. diam., internodes c. .80 cm. long. *Pseudobulbs* up to c. 10 cm. distant, erect or forming an acute angle with the rhizome, broadly ovoid, sometimes grooved beneath, minutely wrinkled transversely, olive-green, c. 1 cm. tall, c. .75 cm. diam., 1-leaved. *Leaf* oblong or ovate-oblong, apex very shortly roundly bilobed, fleshy, coriaceous, many-nerved, grooved above, keeled beneath, 1.35-2.65 cm. long, .50-1.20 cm. wide, petiole cuneate grooved .10-.15 cm. long. *Inflorescences* from the nodes of the rhizome, short, c. 4-flowered, peduncle covered with loose tubular sheaths c. .50 cm. long. *Bracts* a little longer than the pedicel and ovary, ovate, acuminate, acute, c. .27 cm. long. *Flowers* small, sepals yellow in the lower half, deep orange-red in the upper half, c. .65 cm. long, c. .50 cm. wide. *Dorsal sepal* oblong, shortly acuminate, apex fleshy acute with incurved margins, 3-nerved, c. .66 cm. long, c. .25 cm. wide. *Lateral sepals* adnate to the column foot to the middle, ovate-lanceolate, acuminate, apex fleshy acute with incurved margins, 3-nerved, keeled outside,

c. .66 cm. long, c. .28 cm. wide. *Petals* narrowly elliptic, obtuse, 1-nerved, yellow, c. .30 cm. long, c. .12 cm. wide. *Lip* adnate to the apex of the column foot, mobile, entire, fleshy, ovate, apex convex obtuse, orange-red above, orange-yellow tipped deep orange beneath, keels 2 stout from above the base to below the apex margins erect in the lower half recurved in the upper half, c. .20 cm. long, c. .13 cm. wide. *Column* broad, yellow, including the stelidia c. .30 cm. tall, stelidia triangular acuminate very acute with apex incurved, clinandrium excavate transversely oval, stigma very large excavate occupying almost the whole face of the column. *Anther* ovate-oblong, obtuse, base bilobed, grooved on the back at the base, c. .07 cm. long. *Column foot* short, slightly dilate towards the abruptly incurved apex, c. .20 cm. long. *Ovary* 6-grooved, c. .11 cm. long, pedicel terete c. .15 cm. long.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2008.

Described from dried material and a plant preserved in spirit.

Bulbophyllum croceum Lndl. Gen. & Sp. Orch. 57; J. J. S. in Fl. Buit. VI (Orch.) 433, Atlas No. CCCXXVIII; *B. medusella* Ridl. in Journ. F.M.S. Mus. VIII (1917) 97.

This is a variable plant especially in the dimensions of sepals, petals and lip. No. 2064 varies as follows:—Dorsal sepal .90-1.57 cm. long, .17-.30 cm. wide, lateral sepals 1.50-3.80 cm. long; Petals .25-.30 cm. long, .09-.12 cm. wide. Lip .22-.27 cm. long, .08-.15 cm. wide.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2064.

Distribution:—Java.

Bulbophyllum dianthum Schltr. in Engl. Bot. Jahrb. XLV (1911) Beibl. 104, 50. Pl. 9, fig. B.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2087.

Endemic.

Bulbophyllum obtusum Lndl. Gen. & Sp. Orch. 56; J. J. S. in Fl. Buit. VI (Orch.) 438, Atlas No. CCCXXXIII.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2006.

Distribution:—Java.

Bulbophyllum flavidiflorum sp. nov.; *B. obtusum* Lndl. var. *robustum* J. J. S. in Bull. Jard. Bot. Buit. Ser. 2, IX (1913) 88.

Rhizoma elongatum, pervalidum, ramosum. Pseudobulbi plus minusve rhizomati appressi, anguste ovoidei, 1-folii. Folium lanceolatum, acutum vel anguste obtusum et breviter mucronatum. Inflorescentiae breves, ad c. 5-florae. Bracteae ovatae, apiculatae, apiculo lateraliter compresso cariniformi acuto. Sepalum dorsale oblongo-ellipticum, acuminatum, apice carnoso acuto. Sepala lateralia falcata, ovata, longe acuminata, apice carnoso acuto. Petala late elliptica, obtusa. Labellum mobile, integrum, ovatum, subacutum, carinis 2 super basin sub apice evanescentibus. Gynostemium conicum, stelidiis rectis triangularibus acuminatis acutis.

Rhizome elongate, rather stout, branched, covered with tubular sheaths, up to c. .30 cm. diam., internodes up to c. 1.90 cm. long. *Pseudobulbs* 4-8 cm. distant, more or less appressed to the rhizome, narrowly ovoid, minutely wrinkled when dry, c. 2 cm. long, c. .45 cm. diam., 1-leaved. *Leaf* lanceolate, acute or narrowly obtuse and shortly mucronate, keeled beneath, 5.50-9 cm. long, 1.10-1.70 cm. wide, base twisted and narrowed to a grooved petiole up to c. .20 cm. long. *Inflorescences* from the nodes or from below the pseudobulbs, short, up to c. 5-flowered, peduncle covered with tubular sheaths c. .70 cm. long. *Bracts* more than twice as long as the pedicel and ovary, ovate, apiculate, the apiculus laterally flattened keel-like acute, keeled on the back, c. .67 cm. long, c. .30 cm. wide. *Flowers* not widely expanded, pale yellow. *Dorsal sepal* oblong-elliptic, acuminate, apex fleshy acute, 3-nerved, inconspicuously keeled on the back, .80-.90 cm. long, .30-.35 cm. wide. *Lateral sepals* adnate to the column foot to c. the middle, falcate, ovate, long-acuminate, apex fleshy acute, 3-5-nerved, keeled on the back, .90-1.05 cm. long, .28-.35 cm. wide. *Petals* broadly elliptic, obtuse, 1-nerved, c. .35 cm. long, c. .20 cm. wide. *Lip* adnate to the apex of the column foot, mobile, entire, ovate, subacute, apex recurved, keels 2 from above the base to below the apex, margins recurved in the middle, keeled beneath for almost the whole length with the keel grooved, spread out c. .17 cm. long, and as broad. *Column* short, stout, conic, including the stelidia c. .22 cm. tall, stelidia straight triangular acuminate acute, foot roundly incurved with the apex almost parallel to the column c. .12 cm. long.

Largely through the courtesy of the Director of Gardens, Buitenzorg, to whom I am indebted for the loan of material of *B. obtusum* Lndl., *B. obtusum* Lndl. var. *robustum* J. J. S. and several other species of the section *Desmosanthes*, I have been enabled to work out the good series of plants of that section dealt with in this paper.

I am convinced that Dr. J. J. Smith's variety is sufficiently distinct from the typical *B. obtusum* Lndl. to merit specific rating. It is a much stouter plant with shorter inflorescences, larger flowers and a different lip.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2028.

Distribution:—Java.

Bulbophyllum angustifolium Lndl. Gen. & Sp. Orch. 57;
J. J. S. in Fl. Buit. VI (Orch.) 439, Atlas No. CCCXXXIV.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2026.

Distribution:—Malay Peninsula, Java.

Bulbophyllum xanthanthum Schltr. in Engl. Bot. Jahrb. XLV (1911) Beibl. 104, 51.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2090.

Endemic.

Bulbophyllum parvifolium Schltr. in Engl. Bot. Jahrb. XLV (1911) Beibl. 104, 52.

The plant collected on Mount Brengoh in Sarawak by Haviland in December 1892 and quoted by Ridley in Journ. Linn. Soc. XXXI (1896) 279 as *B. capitatum* Lindl. is to be referred to this. I have it also from the Malay Peninsula.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2007.

Distribution:—Malay Peninsula, Borneo, Java.

Bulbophyllum appressicaule Ridl. in Journ. F. M. S. Mus. VIII (1917) 95.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2094.

Endemic.

Bulbophyllum dempoense J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, II (1920) 90.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2096.

Endemic.

Bulbophyllum (\S *Desmosanthes*) **validum** sp. nov. Pl. 10, fig. A. Rhizoma pendulum, elongatum, ramosum. Pseudobulbi basi rhizomati angulum acutum formantes, superne rotundatim recurvi, ovoides-cylindrici, multi-canaliculati, 1-folii. Folium lanceolatum, acutum, basi tortum et in formam petioli brevis angustatum. Inflorescentiae e nodis, rhizomati appressae, breves, ad c. 6-florae. Flores magni, sepalis basi flavis superne laete flavis. Sepalum dorsale oblongum, longe subulato-acuminatum, acutum, acumine carnosum. Sepala lateralia anguste ovata, longe subulato-acuminata, acuta, acumine carnosum. Petala oblique obovata, obtusa, dimidio superiore intus papillosa. Labellum mobile, integrum, parvum, oblongum, acuminatum, obtusum, apice recurvo, carinis 2 super basin in $\frac{1}{4}$ parte sub apice evanescentibus. Gynostemium conicum, stelidiis late triangularibus breviter acuminatis acutis apice leviter recurvis, pede rotundatim incurvo.

Rhizome pendulous, elongate, branched, covered at first with short tubular sheaths, c. .60 cm. long, c. .25 cm. diam., internodes 1.50-2 cm. long. *Pseudobulbs* 3.70-7.70 cm. distant, ovoid-cylindric, base forming an acute angle with the rhizome, roundly recurved above, many-grooved, at first covered with c. 3 loose ovate membranous sheaths, c. 2.50 cm. long, c. .80 cm. diam., 1-leaved. *Leaf* lanceolate, acute, grooved above, keeled beneath, rather fleshy, up to c. 8.25 cm. long, 2.20 cm. wide, base grooved twisted and narrowed in the form of a petiole c. .40 cm. long. *Inflorescences* from the nodes of the rhizome, short, up to c. 6-flowered, peduncle clothed with loose tubular sheaths c. .90 cm. long, rachis c. .30 cm. long. *Bracts* lanceolate, acute, appressed to the pedicel and ovary and exceeding these by c. .15 cm., c. .47 cm. long. *Flowers* large, not widely expanded, c. 1.33 cm. long, c. .80 cm. wide, sepals pale yellow at the base, bright yellow towards the apex. *Dorsal sepal* oblong,

long subulate-acuminate, acute, acumen fleshy c. .35 cm. long, 3-nerved, c. 1.10 cm. long, c. .25 cm. wide. *Lateral sepals* adnate to the column foot to c. the middle, narrowly ovate, long subulate-acuminate, acute, acumen fleshy c. .65 cm. long, 3-nerved, keeled on the back, c. 1.33 cm. long, c. .25 cm. wide. *Petals* obliquely obovate, obtuse, 1-nerved, papillose inside in the upper half, pale yellow, c. .33 cm. long, c. .17 cm. wide. *Lip* adnate to the apex of the column foot, mobile, entire, oblong, acuminate, obtuse, apex recurved, fleshy, keels 2 from above the base to c. $\frac{1}{4}$ below the apex, whitish, base orange, c. .16 cm. long, c. .11 cm. wide. *Column* short, conic, stelidia broadly triangular acuminate acute apex a little recurved, pale yellow, with the stelidia c. .15 cm. tall, stelidia c. .05 cm. long, clinandrium excavate subquadrate, rostellum roundly triangular obtuse, stigma excavate ovate. *Anther* ovate, rather abruptly narrowed to the short rounded beak, base bilobed, c. .07 cm. long and as broad. *Column foot* roundly incurved, tapering to the slightly dilate apex, pale yellow, c. .15 cm. long.

A stout plant perhaps nearest to *B. ovatolanceolatum* J. J. S. also from Sumatra but differing in the grooved strongly curved pseudobulbs, the short inflorescences with c. 6 flowers and the different petals and lip.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2127.

Described from dried material and flowers preserved in spirit.

Bulbophyllum tortuosum Lndl. Gen. & Sp. Orch. 50; J. J. S. in Fl. Buit. VI (Orch.) 450, Atlas No. CCCXLII.

In a wood behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2078.

Distribution:—Sikkim, Malay Peninsula, Java.

Bulbophyllum eruciferum J. J. S. in Bull. Jard. Bot. Buit. Ser. 2. XXV (1917) 77.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2068. Endemic.

Bulbophyllum Lobbii Lndl. Bot. Reg. 1847, sub t. 29; Bot. Mag. t. 4532; J. J. S. in Fl. Buit. VI (Orch.) 446, Atlas No. CCCXXXVIII.

In a precipitous wooded ravine near Piso Piso, c. 4,500 feet, Carr No. 2130.

Distribution:—Malay Peninsula, Borneo, Java.

Cymbidium Dayanum Rchb. f. Gard. Chron. 1869, 710; Ridl. Fl. Mal. Pen. IV, 146.

In a wood above Brastagi village, c. 4,800 feet, Carr No. 2055.

Distribution:—Sikkim, Assam, Malay Peninsula.

Cymbidium roseum J. J. S. in Fl. Buit. VI (Orch.) 475; Bull. Jard. Bot. Buit. Ser. 3, VI, t. 11, f. L.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2067.

Distribution:—Malay Peninsula, Java.

Octarrhena parvula Thw. Enum. 305; J. J. S. in Fl. Buit. VI (Orch.) Atlas No. CCCLXXVII.
Hills above Baros Djahe, c. 5,500 feet, Carr No. 2108.
Distribution:—Ceylon, Malay Peninsula, Java.

Octarrhena flava sp. nov. Pl. 12, fig. A. Caules erecti, validi, e basi ramosi. Folia equitantia, valde lateraliter compressa, falcata, linearia, breviter acuminata, acutissima, carnosa, vagina tubulosa intus sub apice longe libero acutangulariter concava. Inflorescentiae ex internodis intra vaginam folii inferioris, breves, validae, dense multiflorae. Bracteae quaquaversae, late ovatae, acuminatae, acutissimae, marginibus erosae. Sepala petalaque triangulari-ovata, acuta, lateralibus latioribus subsfalcatis, petalis minoribus. Labellum integrum, anguste ovatum, acuminatum, acutum. Gynostemium breve, conicum, pede brevissimo.

Stems erect, stout, branched from the densely rooting base and forming tufts, base covered with old leaf sheaths and fibres, up to c. 14 cm. long. *Leaves* equitant, strongly laterally flattened, straight or a little falcate, linear, shortly acuminate, very acute, fleshy, 1.70–2.20 cm. long, .20–.30 cm. wide, sheaths tubular free and spreading towards the apex and acutangularly concave inside c. 1.10 cm. long. *Inflorescences* from within the sheath of the lower leaf, short, stout, densely many-flowered, peduncle up to c. 1 cm. long covered with tubular sheaths at the base and some bracteiform sheaths above, rachis ribbed c. 3 cm. long. *Bracts* quaquaversal, spreading, apex recurved, broadly ovate, acuminate very acute, margins erose, c. .18 cm. long, c. .11 cm. wide. *Flowers* widely expanded, yellow, c. .30 cm. across. *Sepals* and *petals* triangular-ovate, acute, the lateral sepals subsfalcate and a little dilate on the anterior margin, 1-nerved, dorsal sepal c. .15 cm. long c. .10 cm. wide, lateral sepals c. .15 cm. long c. .13 cm. wide, petals c. .08 cm. long c. .06 cm. wide. *Lip* adnate to the apex of the very short column foot, entire, glabrous, narrowly ovate, acuminate, acute, concave inside with erect margins c. .10 cm. long, c. .05 cm. wide. *Column* short, arms triangular acute, foot very short a little incurved. *Ovary* 6-grooved, pedicel minute.

A stout plant characterised by the short stout dense inflorescences.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2119.

Described from dried material and a plant preserved in spirit.

Phreatia bicallosa Ridl. in Journ. F. M. S. Mus. VIII (1917) 105. Pl. 11, fig. B.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2122.

Endemic.

Phreatia (§ *Caulo-phreatia*) **foveata** sp. nov. Pl. 11, fig. A. Caulis brevis, erectus, validus. Folia linear-lanceolata vel linearilob lanceolata, minute inaequaliter bidentata. Inflorescentiae folia multo superantes, dimidio superiore laxe multiflorae. Bracteae oblong-

gae, acuminatae, acutae. Sepalum dorsale late ovato-oblongum vel suborbiculare, obtuse apiculatum. Sepala lateralia late ovata, obtuse apiculata. Petala late lanceolata, obtusa. Labellum 3-lobum, unguiculatum, ungue cuneato fovea magna transverse oblonga marginibus elevatis omnino fere tecto, lobis lateralibus brevibus oblongis obtusis recurvis, lobo intermedio rotundatim triangulari obtuso. Gynostemium breve, rostellum parvo bidentato. Anthera transverse oblonga, superne in concretionem conicam elevata, rostro brevissimo rotundato.

Stem short, erect, stout, covered with the old leaf sheaths, densely rooting at the base, roots stout terete glabrous, up to c. 2 cm. long. *Leaves* linear-lanceolate or linear-ob lanceolate, minutely unequally bidentate, grooved above, keeled beneath, 1.65-4.50 cm. long, .18-.30 cm. wide, sheaths highly convex ribbed outside with a strong median keel free for about .40 cm. apex truncate up to c. .70 cm. long. *Inflorescences* from among the leaves, erect, much longer than the leaf, laxly few-flowered; peduncle very slender with some tubular sheaths at the base and 1 or 2 at intervals above, up to c. 4.50 cm. long; rachis somewhat sinuous, more slender than the peduncle, up to c. 6.50 cm. long. Bracts appressed to the ovary and pedicel, strongly recurved from the base, oblong, acuminate, acute, 1-nerved. *Flowers* erect when in bud, strongly recurved reversed when open, pale greenish, well expanded, c. .22 cm. across. *Dorsal sepal* broadly ovate-oblong or suborbicular, obtusely apiculate, 1-nerved, c. .10 cm. long, c. .09 cm. wide. *Lateral sepals* broadly ovate, obtusely apiculate, 1-nerved, c. .11 cm. long, c. .09 cm. wide. *Petals* broadly lanceolate, obtuse, 1-nerved, c. .09 cm. long, c. .05 cm. wide. *Lip* adnate to the base of the column, 3-lobed, clawed, 3-nerved, spread out c. .12 cm. long, c. .10 cm. wide, claw cuneate almost entirely covered by a large transversely oblong fovea with raised margins, side lobes very short oblong turned towards the base of the lip, midlobe much larger roundly triangular obtuse margins minutely erose. *Column* short, stout, rostellum short bifid, stigma large transversely oval. *Anther* transversely oblong with a conic thickening above, beak very small rounded, pale yellow. *Pollinia* obovoid, caudicle linear.

A small species well characterised by the large fovea on the claw of the distinctly 3-lobed lip.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2035.

Described from dried material and plants preserved in spirit.

Vanda leucostele Schltr. in Eng. Bot. Jahrb. XLV (1911) Beibl. 104, 56.

Hills beyond Baros Djahe, c. 5,500 feet, Carr No. 2133.

Endemic.

Luisia teretifolia Gaud. Bot. Freyc. Voy. 427, t. 37; J. J. S. in Fl. Buit. VI (Orch.) 545, Atlas No. CDXIII.

Baros Djahe village on a tree by the roadside, c. 4,500 feet,
Carr No. 2113.

Distribution:—Ceylon, Java, Amboina, New Caledonia.

Adenonecos suborbicularis sp. nov. Pl. 12, fig. B. Planta caespitosa. Caules flexuosi, basi penduli, superne (parte foliosa) erecti. Folia alternatim bifaria, crasse carnosa, leviter lateraliter compressa, intus rotundatim acutangulariter concava, extus rotundatim convexa, lanceolata, apiculata, apiculo brevi triangulari lateraliter compresso, vaginis tubulosis. Inflorescentiae brevissimae, 1-2-florae, pedunculo minuto vaginato. Sepalum dorsale oblongo-ellipticum, obtusum. Sepala lateralia lanceolata, obtusa. Petala oblonga, obtusa. Labellum integrum, concavum, carnosum, suborbicular, obtuse apiculatum, callo integro ad 3-lobulo verruculoso donatum.

A tufted plant. *Stems* flexuous, base pendulous, recurved erect above (in the leafy part), rather stout, lower part covered with old leaf sheaths, base densely rooting, up to c. 14 cm. long. *Leaves* alternate, thickly fleshy, slightly laterally flattened with the sides a little rounded, lanceolate, apiculate with the apiculus short triangular laterally flattened, inside acutangularly or rightangularly concave rounded on each side of the median groove, beneath roundly convex, up to c. 1.30 cm. long, c. .25 cm. wide, sheaths tubular ribbed and minutely wrinkled up to c. .45 cm. long. *Inflorescences* very short, 1-2-flowered, peduncle minute clothed with short tubular sheaths. *Bracts* shortly and broadly ovate, very shortly acuminate, subacute. *Flowers* well expanded, fleshy, sepals and petals yellow-green, c. .35 cm. long, c. .40 cm. wide. *Dorsal sepal* oblong-elliptic, obtuse, 1-nerved, c. .28 cm. long, c. .12 cm. wide. *Lateral sepals* lanceolate, obtuse, 1-nerved, keeled on the back, c. .30 cm. long, c. .12 cm. wide. *Petals* oblong, obtuse, 1-nerved, margins irregular, c. .25 cm. long, c. .08 cm. wide. *Lip* adnate to the base of the column, entire, thickly fleshy, suborbicular, obtusely apiculate, concave very shiny inside with a short low entire or shortly 3-lobed warty callus at the base, yellow-green with paler callus, spread out c. .30 cm. long and as broad or a little broader. *Column* short, stout, green, c. .10 cm. tall and about as broad, apex truncate, clinandrium slightly excavate transversely oblong with a median keel, rostellum elevate fleshy oblong apex bifid grooved inside, stigma large excavate suborbicular. *Anther* conic, seen from above triangular-ovate, grooved above, beak short retuse concave inside, yellow, c. .07 cm. long, c. .10 cm. wide. *Pollinia* 2, suborbicular, caudicle linear with revolute margins, disc. oblong.

Above Baros Djahe, c. 5,500 feet, Carr No. 2111.

Described from dried material and a plant preserved in spirit.

Sareochilus fraternus J. J. S. in Bull. Jard. Bot. Buit. Ser. 2. XXVI (1918) 85; loc. cit., Ser. 3. VI, t. 12, f. IV.

On trees near the Brastagi Hotel, c. 4,800 feet, Carr No. 2079.
 Distribution:—Java.

Sarcochilus emarginatus Rchb. f. Walp. Ann. VI, 500;
 J. J. S. in Fl. Buit. VI (Orch.) 561, Atlas No. CDXXIII.
 Hills above Baros Djahe, c. 5,500 feet, Carr No. 2107.
 Distribution:—Borneo, Java.

Thrixspermum brevibracteatum J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. X, 71.
 Gunong Baros, c. 5,500 feet, Carr No. 2098.
 Endemic.

Thrixspermum Doctersii J. J. S. in Bull. Jard. Bot. Buit. Ser. 2. XIV (1914) 41; loc. cit., Ser. 3. IX, t. 6, f. IV.
 New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2073.
 Distribution:—Java.

Thrixspermum agamense J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. IX, 180.
 Baros Djahe on an isolated tree by the side of the road, c. 4,800 feet, Carr No. 2114.
 Endemic.

Saccolabium pusillum Bl. Bijdr. 292, f. 40; J. J. S. in Fl. Buit. VI (Orch.) 642, Atlas No. CDLXXVIII.
 New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2075.
 Distribution:—Java.

Omaea micrantha Bl. Bijdr. 359; J. J. S. in Fl. Buit. VI (Orch.) Atlas No. CDLXXXI.
 New road N. W. of Lake Toba together with the former, c. 5,000 feet, Carr No. 2076.
 Distribution:—Java.

Gastrochilus sororius Schltr. in Fedde Report. XII (1913) 315; J. J. S. in Fl. Buit. VI (Orch.) Atlas No. CDLXXII: *G. calceolare* J. J. S. (not Lindl.) in Fl. Buit. VI (Orch.) 632.
 New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2086.
 Distribution:—Java.

Malleola paniculata sp. nov. Pl. 13, fig. A. Caulis validus, ramosus. Folia linearia vel anguste oblonga, in $\frac{1}{4}$ parte sub apice praesertim sensim angusta, inaequaliter obtuse biloba vel obtuse obliqua, crasse carnosa, vaginis tubulosis costatis. Inflorescentiae folia multo superantes, 3-6-paniculatae, laxe multiflorae. Bracteae breves, ovatae, acutae. Flores minimi. Sepalum dorsale oblongo-oblanceolatum, brevissime acuminatum, obtusum. Sepala lateralia falcata, obovata, subacuta. Petala e basi brevissime unguiculata oblonga, obtusa, subfalcata. Labellum 3-lobum, calcaratum, callo transverso apici piloso sub lobo intermedio, lamella transversa glabra

parieti dorsali faucem calcaris prope, lobis lateralibus erectis triangularibus obtusis, lobo intermedio valde recurvo ovato-oblongo obtuso, calcare magno ovoideo obtuso.

Stem stout, branched, lower part covered with the old leaf sheaths, more than 17 cm. long, c. .60 cm. diam., base densely rooting, roots elongate stout terete minutely wrinkled. *Leaves* linear or narrowly oblong, distinctly narrowed at c. $\frac{1}{4}$ below the apex, unequally obtusely bilobed or obtusely oblique, thickly fleshy, coarsely longitudinally wrinkled beneath when dry, c. 7.70 cm. long, c. 1 cm. wide, sheaths tubular ribbed longer than the internodes transversely wrinkled when dry up to c. 2.15 cm. long. *Inflorescences* from the base of the internode behind the leaves, perforating 2 sheaths, 3-6-panicked, peduncle terete with a very short tubular sheath at the base and c. 2 at intervals above, a short loose tubular sheath at the base of each panicle, panicles flexuous many-ribbed laxly many-flowered c. 7 cm. long. *Bracts* appressed to the pedicel ovate, acute, c. .10 cm. long. *Flowers* very small, sepals sparingly hairy outside with margins minutely erose and minutely papillose towards the apex, olive-green suffused dark brown-purple outside. *Dorsal sepal* oblong-ob lanceolate, very shortly acuminate with the acuminate part abruptly thinner in texture, obtuse, 3-nerved, c. .26 cm. long, c. .15 cm. wide. *Lateral sepals* falcate, obovate, subacute, 3-nerved, c. .26 cm. long, c. .18 cm. wide. *Petals* oblong above the very shortly clawed base, obtuse, 1-nerved, c. .20 cm. long, c. .10 cm. wide. *Lip* adnate to the base of the column, 3-lobed, spurred, a transverse horse-shoe callus hairy at the apex from below the apex of the side lobes passing below the base of the midlobe, a transverse lamella at the mouth of the spur inside on the dorsal wall, c. .25 cm. long, c. .30 cm. tall from the tip of the spur to the apex of the side lobes; *side lobes* erect, roundly triangular, obtuse, fleshy, often minutely erose at the base of the anterior margin and papillose in the sinus, bright yellow, c. .20 cm. long; *midlobe* abruptly recurved, fleshy, a conic thickening at the base, ovate-oblong, obtuse, yellow, c. .07 cm. long; *spur* pendulous, forming an acute angle with the ovary, ovoid, obtuse, pale yellow, c. .18 cm. long. *Column* short, stout, hammer-shaped, keeled on the sides. *Anther* ovate, shortly beaked. *Pollinia* 2, oblong, c. .035 cm. long, caudicle linear-spathulate abruptly recurved then porrect below the pollinia c. .075 cm. long, disc rather large oval c. .035 cm. long.

A stout plant with short fleshy leaves, panicled lax inflorescences and very small flowers. The callus at the base of the midlobe and the lamella on the back wall of the spur almost meet and close the spur mouth.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2128.

Described from dried material and flowers preserved in spirit.

Malleola callosa sp. nov. Pl. 13, fig. B. Caulis per validus. Folia late oblongo-ob lanceolata vel oblongo-lanceolata, leviter obliqua, apice oblique obtuso, vaginis tubulosis costatis. Inflorescentiae

simplices, dense multiflorae. Bracteae lanceolatae, acuminatae, acutae. Flores parvi. Sepalum dorsale e basi linearis-unguiculata ellipiticum, obtusum. Sepala lateralia falcata, e basi linearis-unguiculata obovata, obtusa, margine antico medio fere leviter dilatato. Petala anguste elliptica, subacuta. Labelum 3-lobum, calcaratum, callo conico obtuso vel leviter transverse sulcato inter lobos laterales super faucem calcaris, concretionē humili faucem calcaris prope parieti dorsali, lobis lateralibus humilibus rotundatis e lobo intermedio sinuato separatis, lobo intermedio carnosō subulato acuto, calcare pendulo cylindrico obtuso.

Stem rather stout, covered above the base with old leaf sheaths, rooting from the old internodes, roots elongate stout terete minutely wrinkled, c. 8 cm. long, c. .40 cm. diam. *Leaves* broadly oblong-lanceolate or oblong-ob lanceolate, slightly oblique, obliquely obtuse, flaccid, grooved above, keeled beneath, dark dull green often dotted purple when young, c. 10.70 cm. long, c. 3.20 cm. wide, sheaths tubular ribbed dilate upwards up to c. 1.90 cm. long. *Inflorescences* from above the base of the internodes behind the leaves, simple, peduncle terete with 1 or 2 short tubular sheaths at the base and one with long free acute apex above c. 4.50 cm. long, rachis densely many-flowered c. 8 cm. long. *Bracts* lanceolate, acute, pale greenish dotted violet, c. .25 cm. long, c. .08 cm. wide. *Flowers* very small, sepals and petals pale greenish yellow, the sepals with a purple spot at the apex. *Dorsal sepal* elliptic above the shortly clawed linear base, obtuse, 1-nerved, roundly convex outside, c. .23 cm. long, c. .13 cm. wide. *Lateral sepals* falcate, obovate above the shortly linearly clawed base, obtuse, 1-nerved, convex keeled outside, c. .23 cm. long, c. .12 cm. wide. *Petals* narrowly elliptic, subacute, 1-nerved, convex outside, c. .19 cm. long, c. .08 cm. wide. *Lip* adnate to the base of the column, 3-lobed, spurred, callus between the side lobes at the entrance to the spur conic obtuse or transversely and inconspicuously grooved, a low swelling on the back wall of the spur at the mouth, glabrous, spread out c. .30 cm. long, c. .24 cm. from the tip of the spur to the base of the lip; *side lobes* erect, low, rounded, separated from the midlobe by a wide sinus, white; *midlobe* fleshy, a little recurved above the base, subulate, acute, white, c. .13 cm. long; *spur* pendulous, cylindric, obtuse, creamy white, c. .15 cm. long. *Column* short, hammer-shaped above, pale yellow, clinandrium ovate not excavate with a conic swelling above the base of the rostellum, rostellum suberect triangular acute, stigma small excavate suborbicular. *Anther* ovate, shortly retusely beaked, grooved, above, yellow. *Pollinia* 2, suborbicular, minutely wrinkled, caudicle narrowly spatulate, disc large oval, in all c. .075 cm. long.

An ally of *M. batakense* Schltr. but differing in the larger obliquely obtuse leaves and larger different flowers.

Hill forest behind the Brastagi Hotel, c. 5,500 feet, Carr No. 2137. A sterile plant seen had a stem which measured 30 cm. in length.

Described from dried material and an inflorescence preserved in spirit.

Schoenorchis juncifolia Bl. Bijdr. 361, f. 23; J. J. S. in Fl. Buit. VI (Orch.) Atlas No. CDLIV.

Woods behind the Brastagi Hotel, c. 4,800 feet, Carr No. 2129.

Distribution:—Java.

Sarcanthus muticus J. J. S. in Fl. Buit. VI (Orch.) 602, Atlas No. CDXLVIII.

New road N. W. of Lake Toba, c. 5,000 feet, Carr No. 2136.

Distribution:—Java.

Trichoglottis simplex J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, X, 77.

In a wood above Brastagi village, c. 4,800 feet, Carr No. 2059.
Endemic.

Trichoglottis adnata J. J. S. in Bull. Dep. Agr. Ind. neerl. XV (1908) 23.

In a wood near Brastagi village, c. 4,500 feet, Carr No. 2093.
Endemic.

Taeniophyllum Jacobsonii J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, X, 82.

On a small tree by the side of the Medan-Brastagi road, c. 3,500 feet, Carr No. 2001.

Endemic.

EXPLANATION OF PLATES.

PLATE 1, A. *NERVILIA PETALOIDEA* CARR.

- a. Bract.
- b. Dorsal sepal.
- c. Petal.
- d. Lip.
- e. Lip and column.
- f. Lateral sepal.
- g. Column, from the back.
- h. Anther, from above.
- i. Anther, from the side.

All enlarged.

PLATE 1, B. *HERPYSMA SUMATRANA* CARR.

- a. Bract.
- b. Dorsal sepal.
- c. Lateral sepal.
- d. Petal.
- e. Lip.
- f. Spur, in section.
- g. Lip and column.
- h. Column, from the front.
- i. Anther, back.
- j. Anther, beneath.
- k. Disc of pollinium.

All enlarged.

PLATE 2, A. *PHOLIDOTA VAGINATA* CARR.

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip.
- e. Lip and column.
- f. Column, from the front.
- g. Anther.

All enlarged.

PLATE 2, B. *DENDROCHILUM CARINATUM* CARR.

- a. Bract.
- b. Dorsal sepal.
- c. Lateral sepal.
- d. Petal.
- e. Lip.
- f. Lip and column.
- g. Column from the front.
- h. Column from the side.

All enlarged.

PLATE 3. APPENDICULA INERMIS CARR.

- a. Portion of the rachis.
- b. Bract.
- c. Dorsal sepal.
- d. Lateral sepal.
- e. Petal.
- f. Lip.
- g. Column, from the side.
- h. Column, from beneath.
- i. Lip and column.

PLATE 4, A. CALANTHE ANGUSTIFOLIA BL. VAR. SUMATRANA CARR.

- a. Flower, from the side.
 - b. Dorsal sepal.
 - c. Lateral sepal.
 - d. Petal.
 - e. Lip.
 - f. Lip and column.
 - g. Anther.
- a, f. natural size, remainder enlarged.*

PLATE 4, B. CALANTHE EPIPHYTICA CARR.

- a. Bract.
 - b. Dorsal sepal.
 - c. Lateral sepal.
 - d. Petal.
 - e. Lip.
 - f. Lip and column.
 - g. Column.
 - h. Anther.
- f. natural size, remainder enlarged.*

PLATE 4, C. CALANTHE RIGIDIA CARR VAR. GRACILIS CARR.

- a. Dorsal sepal.
 - b. Lateral sepal.
 - c. Petal.
 - d. Lip.
 - e. Lip and column.
 - f. Column, from the side.
 - g. Column, from the front.
- e. natural size, remainder enlarged.*

PLATE 5, A. CERATOSTYLIS SCARIOSA RIDL.

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip.
- e. Lip and column.

All enlarged.

PLATE 5, B. *DENDROBIUM MALVICOLOR RIDL.*

- a. Stem with inflorescence.
- b. Bract.
- c. Dorsal sepal.
- d. Lateral sepal.
- e. Petal.
- f. Lip.
- g. Column, from the front.
- h. Anther.

a, natural size, remainder enlarged.

PLATE 6, A. *DESMOTRICHUM TRIFURCATUM CARR.*

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip.
- e. Anther.

All enlarged.

PLATE 6, B. *BULBOPHYLLUM TAPIRUS J. J. S.*

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip.
- e. Lip and column.

a, b, natural size, remainder enlarged.

PLATE 7, A. *BULBOPHYLLUM REMIFERUM CARR.*

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Apex of lateral sepal.
- d. Petal.
- e. Lip, from beneath.
- f. Lip and column.

All enlarged.

PLATE 7, B. *BULBOPHYLLUM CONNATUM CARR.*

- a. Dorsal sepal.
- b. Lateral sepals.
- c. Petal.
- d. Lip.
- e. Lip, from the side.
- f. Column, from the side.
- g. Anther, from the side.

a, b, natural size, remainder enlarged.

PLATE 8, A. *BULBOPHYLLUM BRASTAGIENSE CARR.*

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.

PLATE 8, A. *BULBOPHYLLUM BRASTACIENSE CARR.*—(contd.)

- d. Petal.
 - e. Lip.
 - f. Column, from the side.
- All enlarged.*

PLATE 8, B. *BULBOPHYLLUM FILOVAGANS CARR.*

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip.
- e. Flower.
- f. Column, from the side.

All enlarged.

PLATE 9, A. *BULBOPHYLLUM LONGIVAGANS CARR.*

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip.
- e. Lip and column.
- f. Anther.
- g. Plant.

g, natural size, remainder enlarged.

PLATE 9, B. *BULBOPHYLLUM DIANTHUM SCHLTR.*

- a. Plant.
- b. Dorsal sepal.
- c. Lateral sepal.
- d. Lip.
- e. Lip and column.
- f. Petal.

a, natural size, remainder enlarged.

PLATE 10, A. *BULBOPHYLLUM VALIDUM CARR.*

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip.
- e. Lip and column.
- f. Anther.

All enlarged.

PLATE 10, B. *BULBOPHYLLUM DEMINUTUM J. J. S.*

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip.
- e. Plant.
- f. Flower, in section.

e, natural size, remainder enlarged.

PLATE 11, A. PHREATIA FOVEATA CARR.

- a. Bract.
- b. Dorsal sepal.
- c. Lateral sepal.
- d. Petal.
- e. Lip.
- f. Flower.

All enlarged.

PLATE 11, B. PHREATIA BICALLOSA RIDL.

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip.
- e. Column, from the side.

All enlarged.

PLATE 12, A. OCTARRHENEA FLAVA CARR.

- a. Bract.
- b. Dorsal sepal.
- c. Lateral sepal.
- d. Petal.
- e. Lip.
- f. Lip and column.

All enlarged.

PLATE 12, B. ADENONCOS SUBORBICULARIS CARR.

- a. Plant.
- b. Dorsal sepal.
- c. Lateral sepal.
- d. Petal.
- e. Lip.
- f. Lip and column.
- g. Anther.
- h. Pollinia.
- i. Cross section of leaf.
- j. Column.

a, natural size, remainder enlarged.

PLATE 13, A. MALLEOLA PANICULATA CARR.

- a. Dorsal sepal.
- b. Lateral sepal.
- c. Petal.
- d. Lip and column.
- e. Pollinia, from above.
- f. Pollinia, from beneath.

All enlarged.

PLATE 13, B. *MALLEOLA CALLOSA* CARR.

- a. Dorsal sepal.
 - b. Lateral sepal.
 - c. Petal.
 - d. Lip and column.
 - e. Anther.
 - f. Pollinia, from above.
-

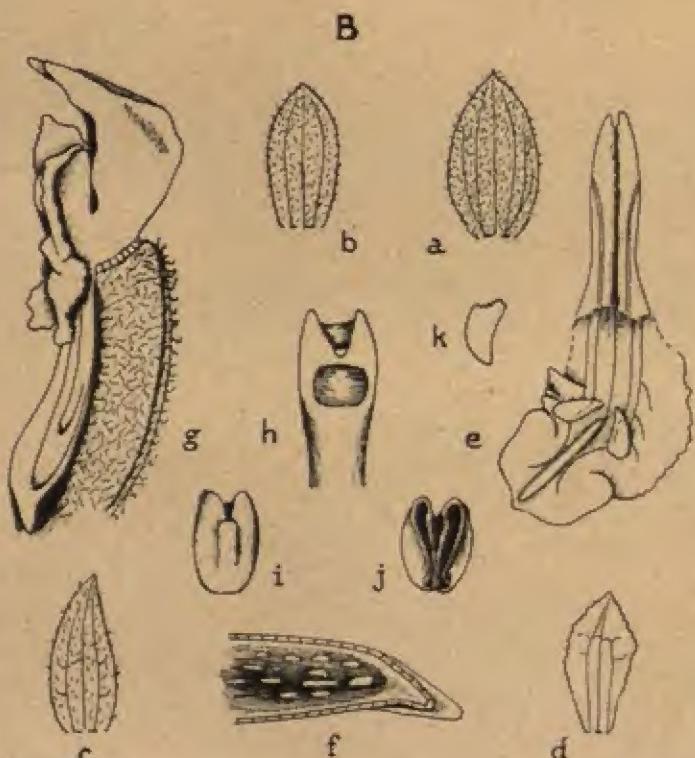
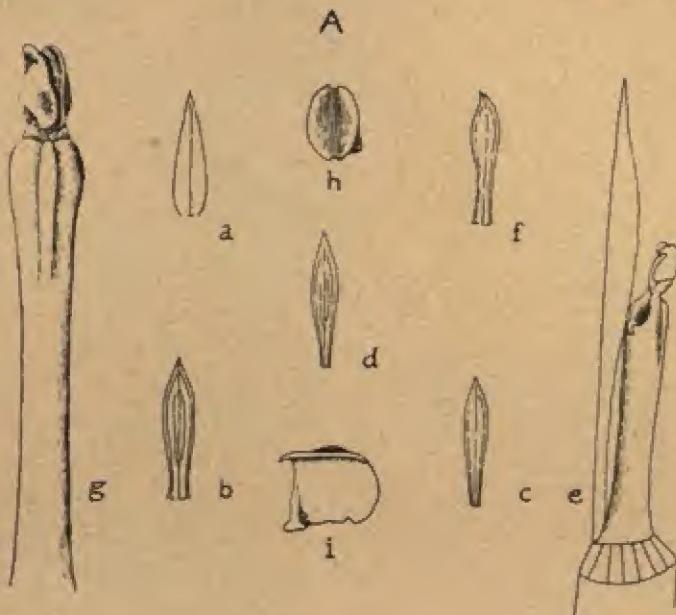
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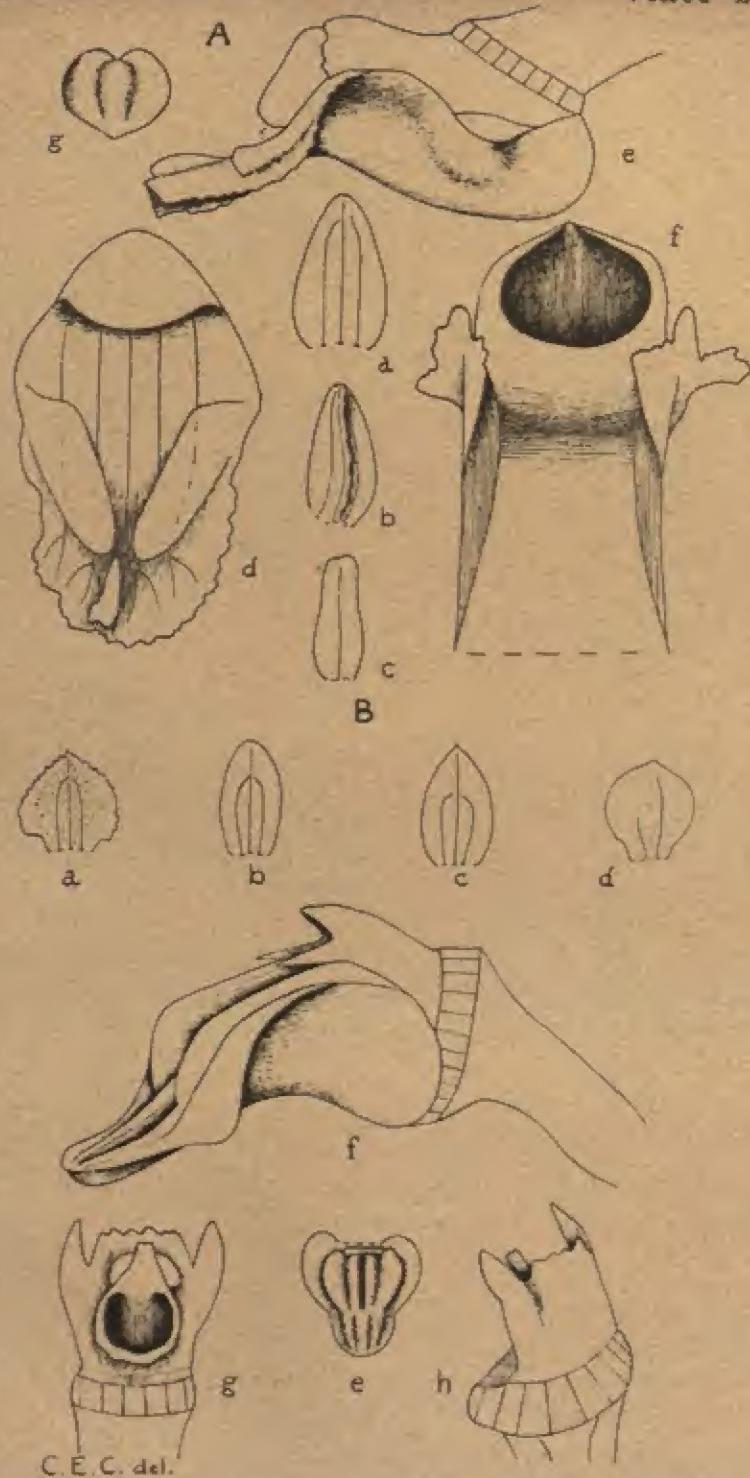
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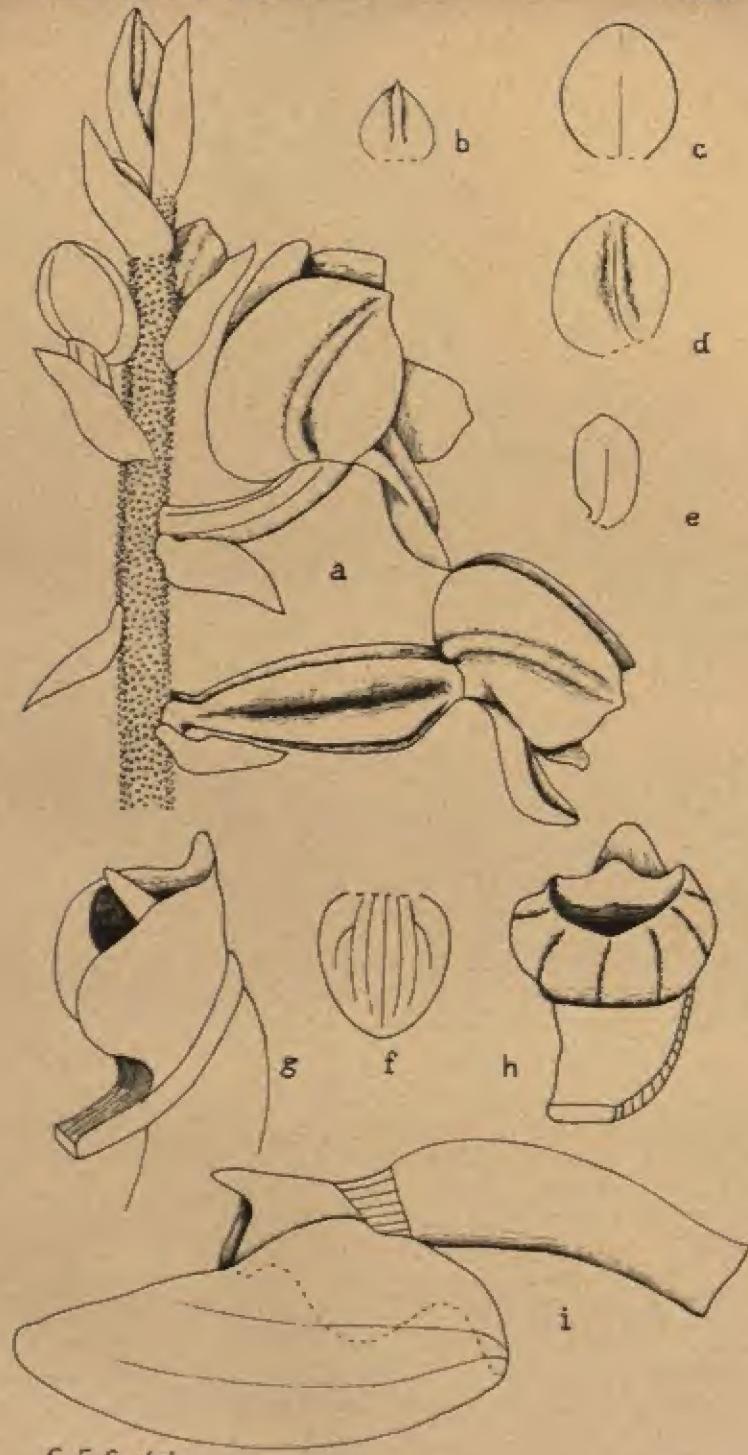
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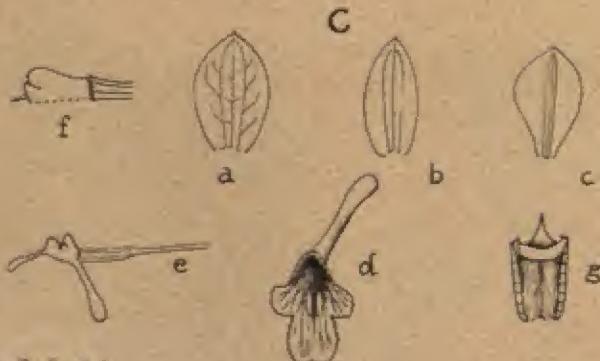
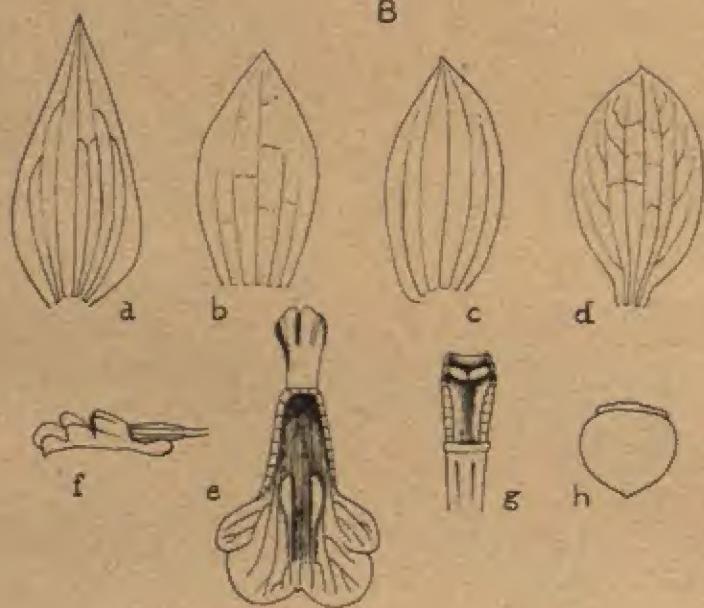
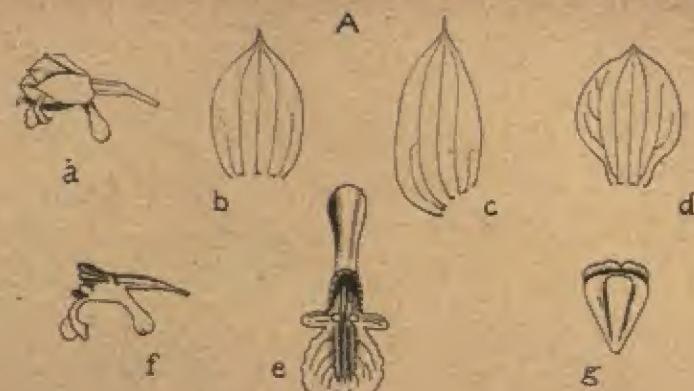


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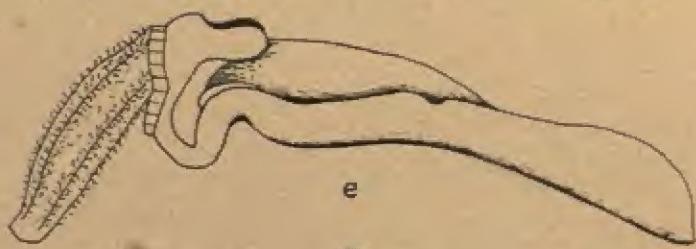
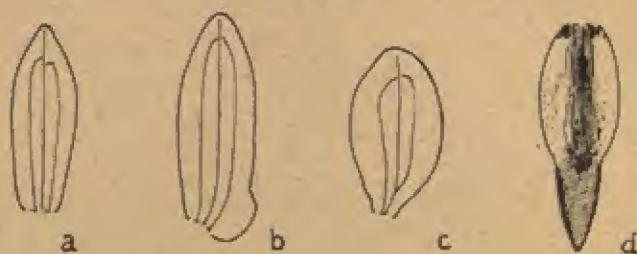


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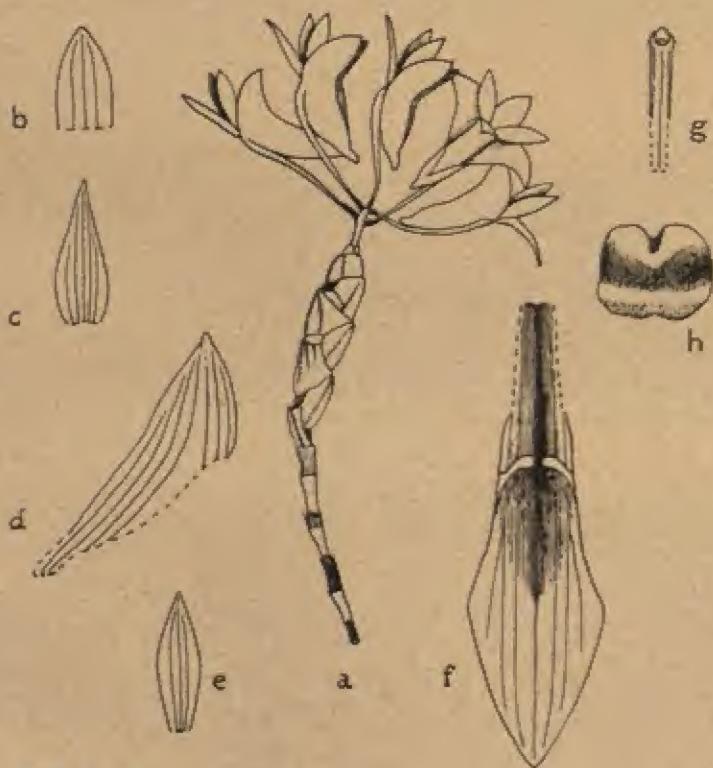


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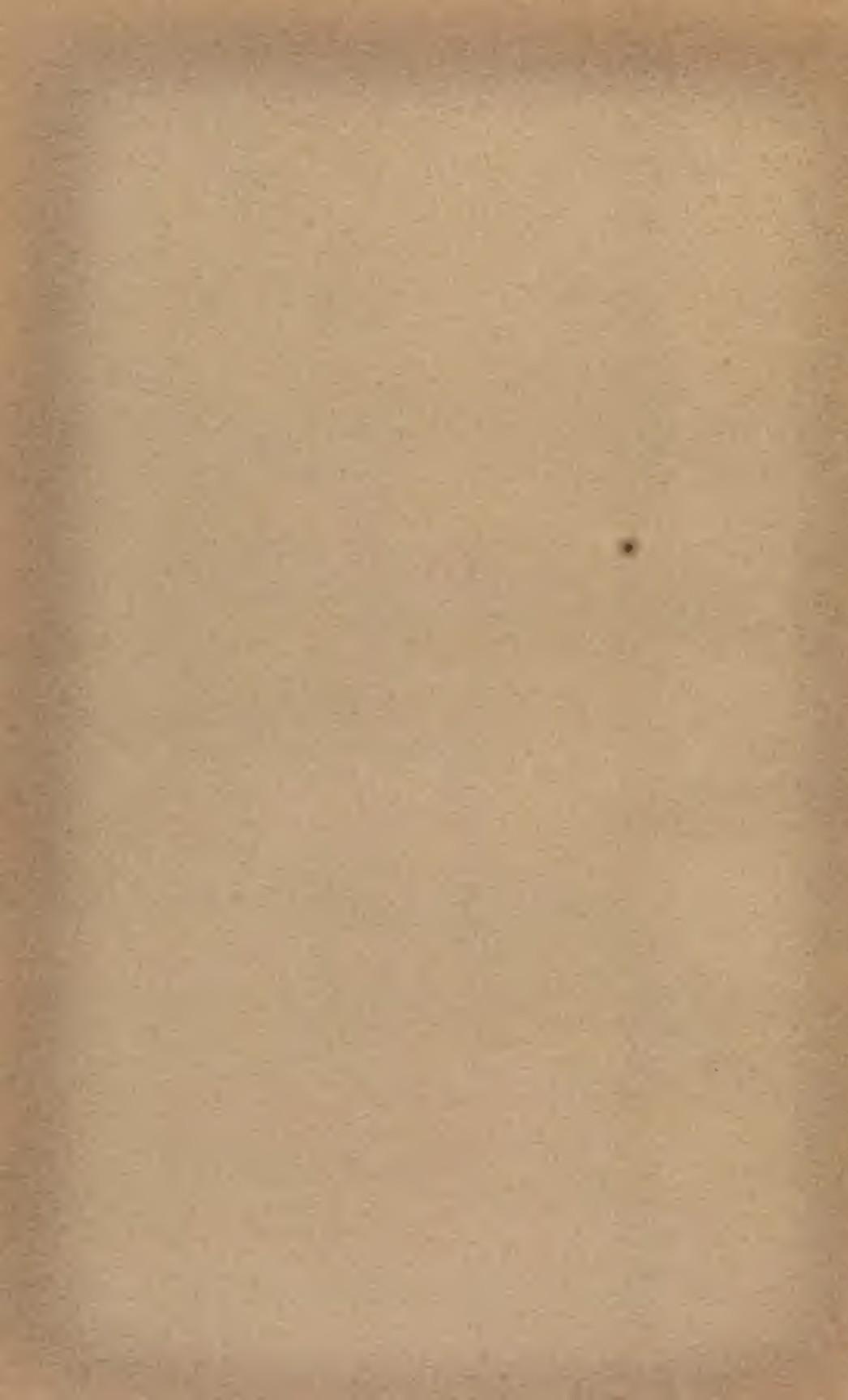
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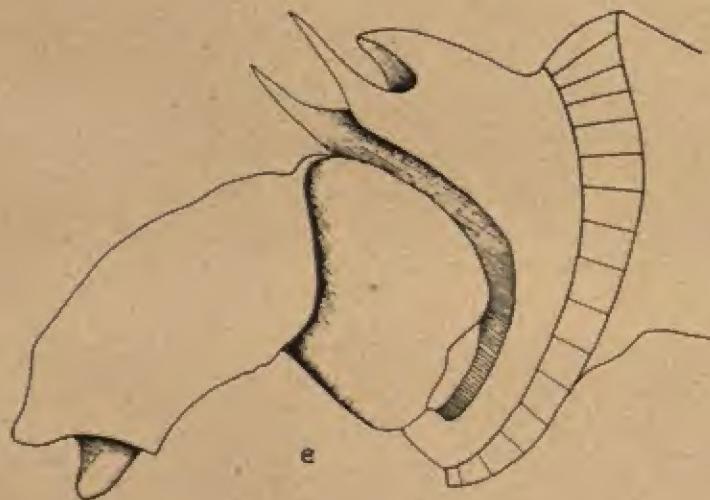
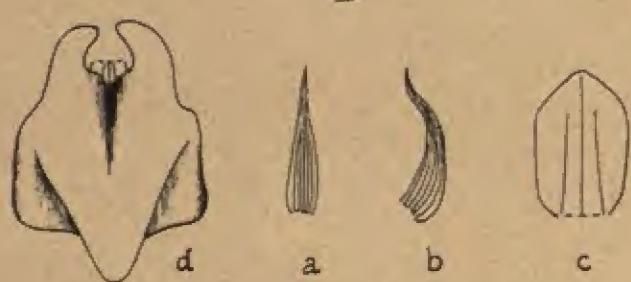
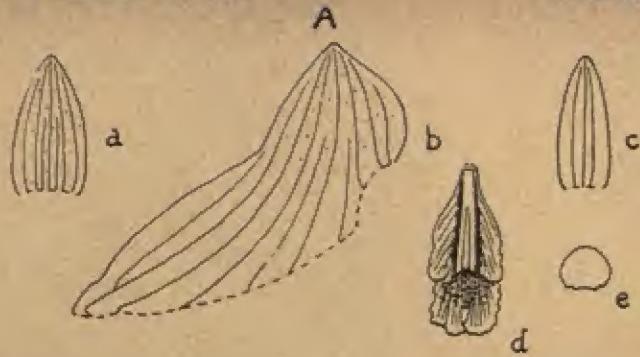


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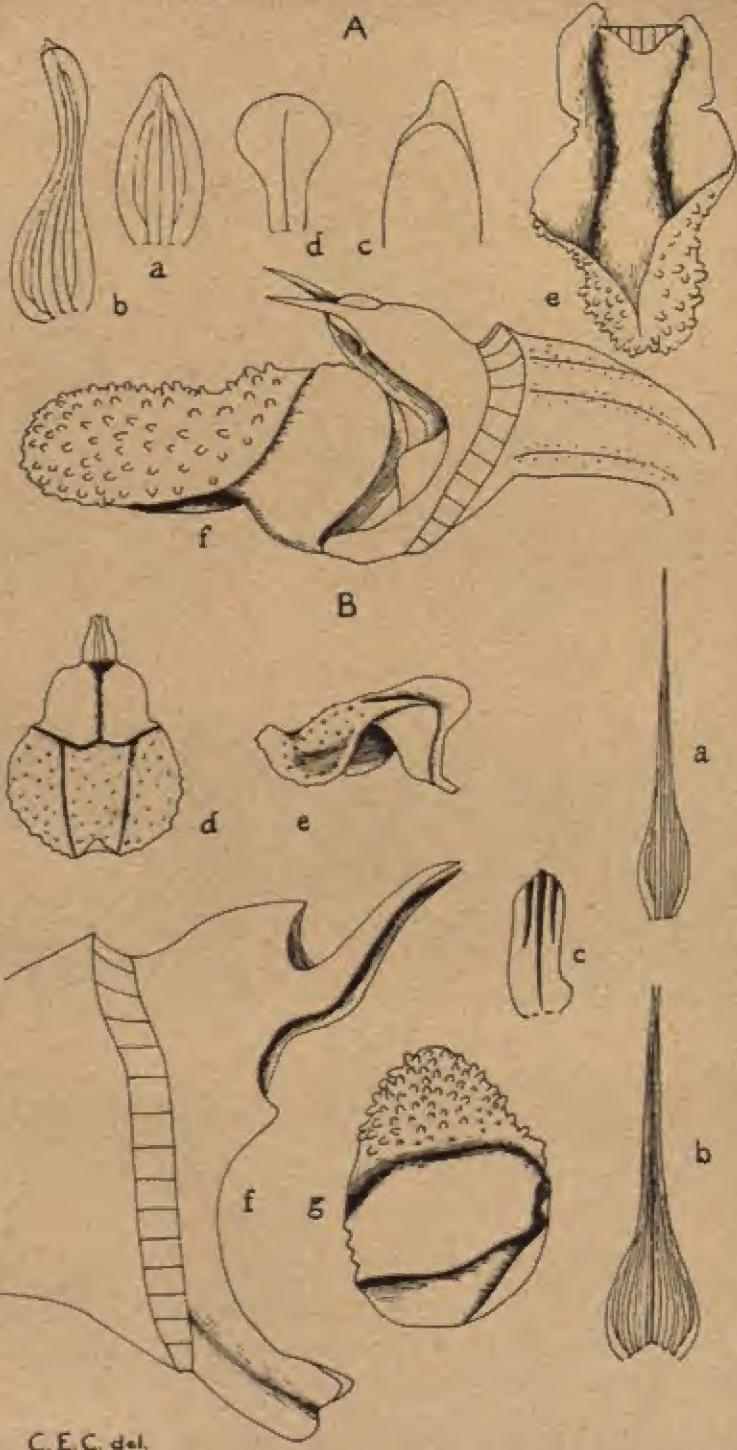


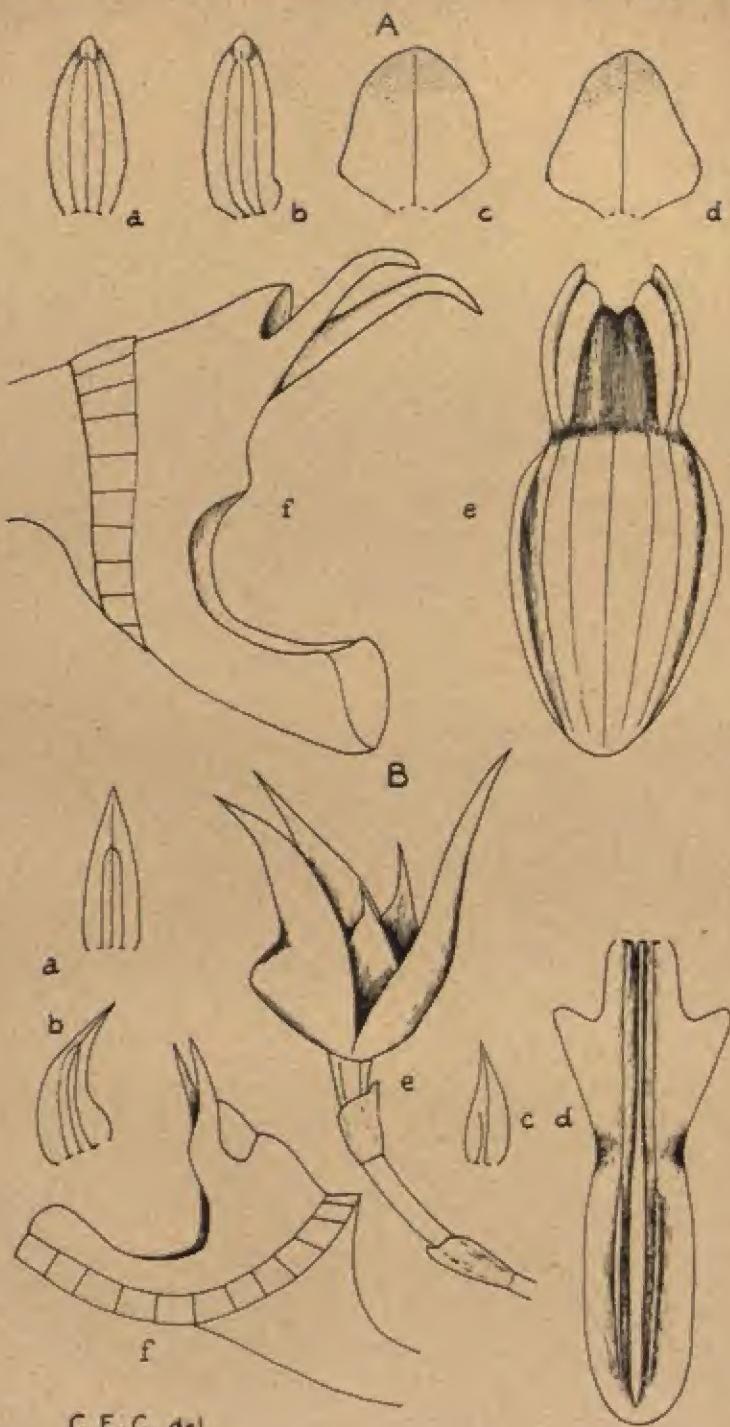
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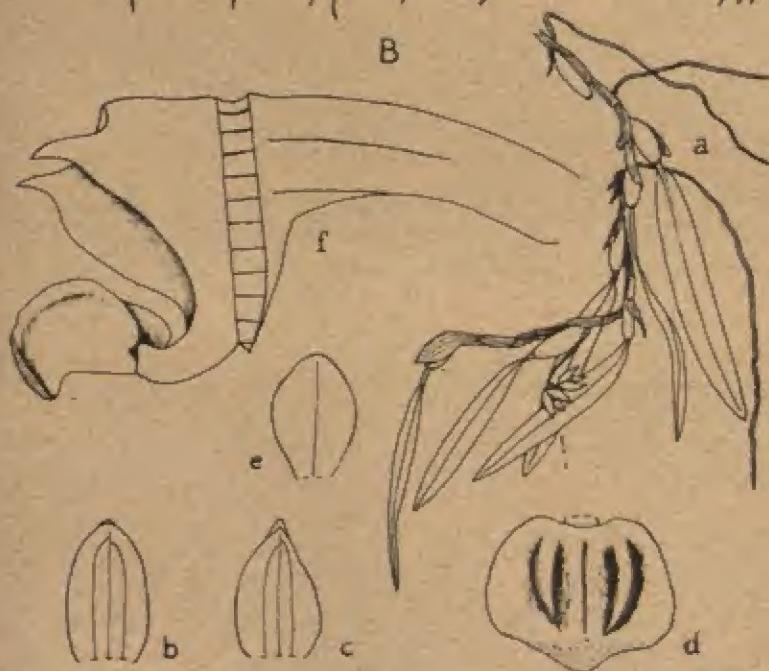
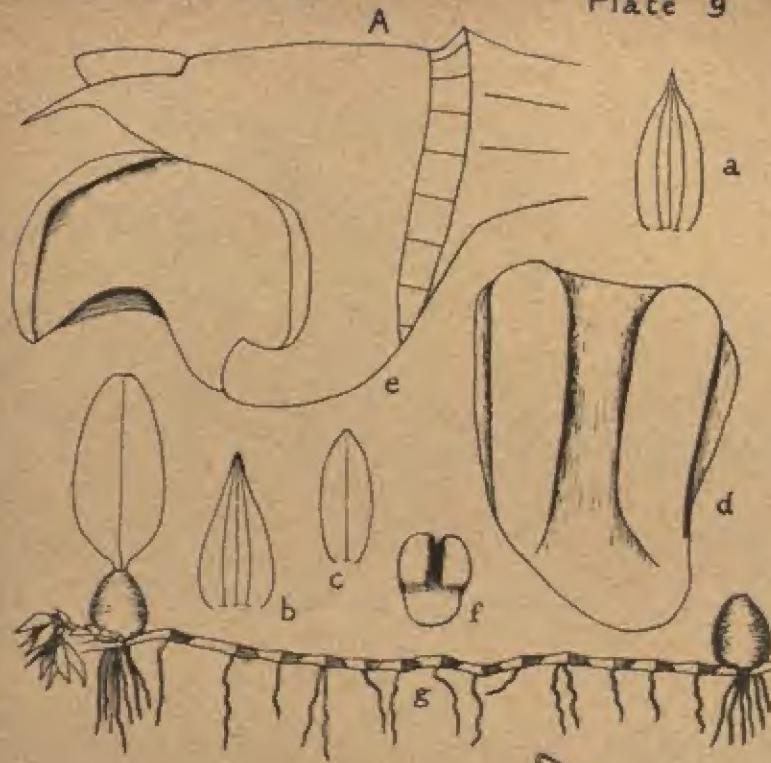


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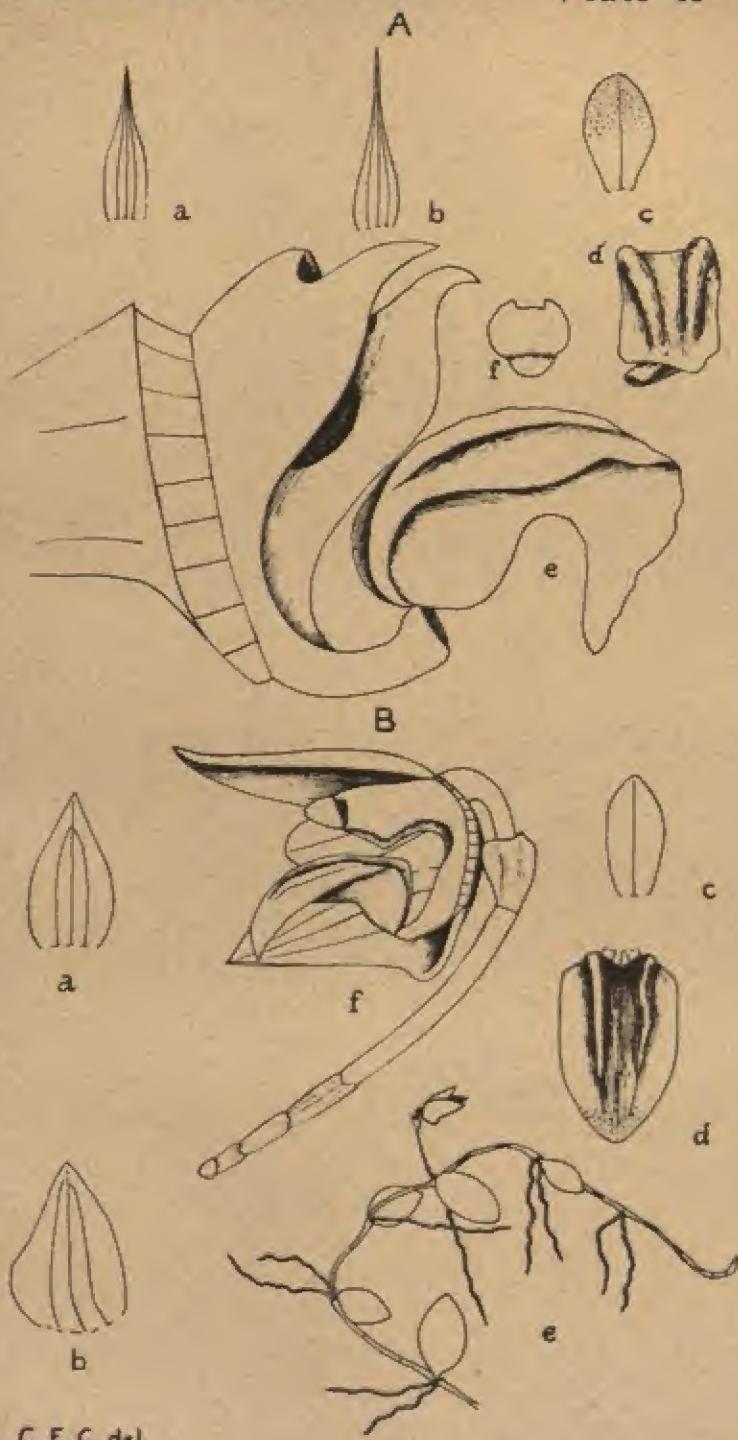


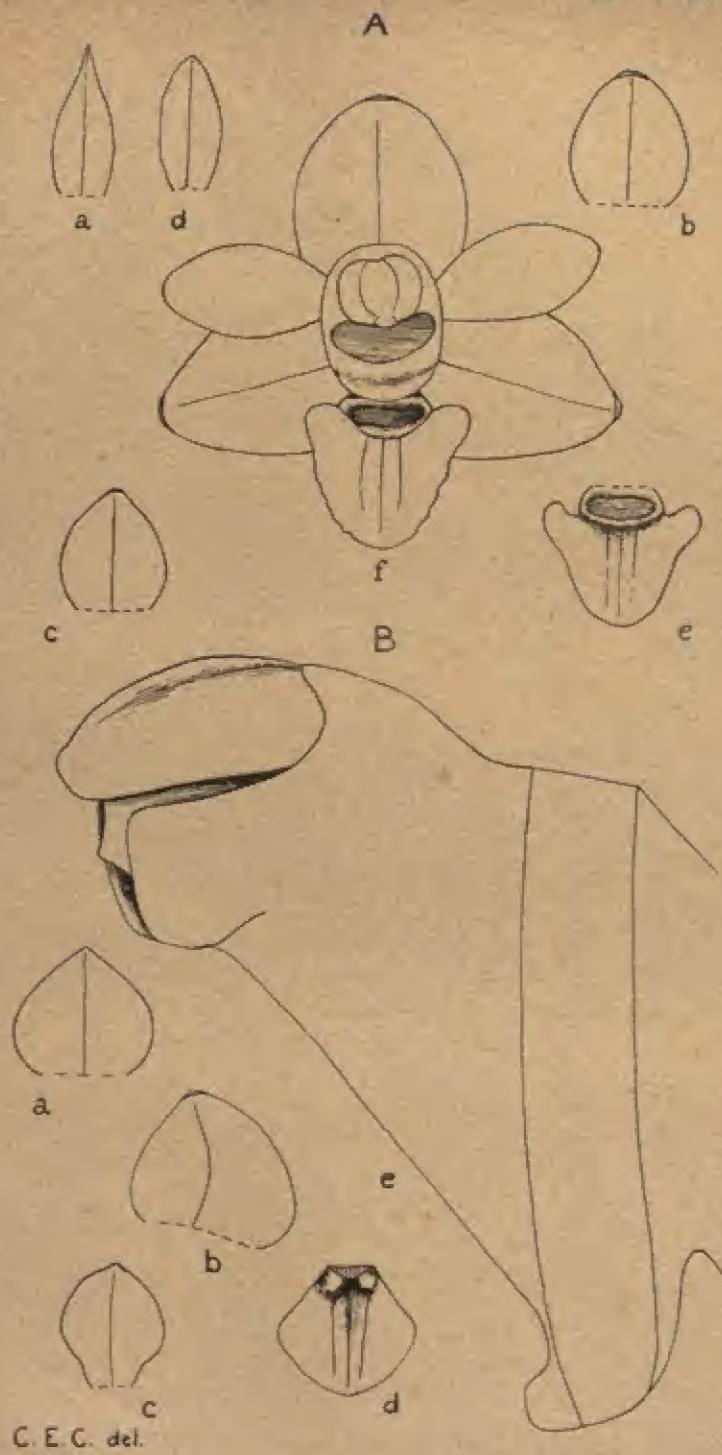


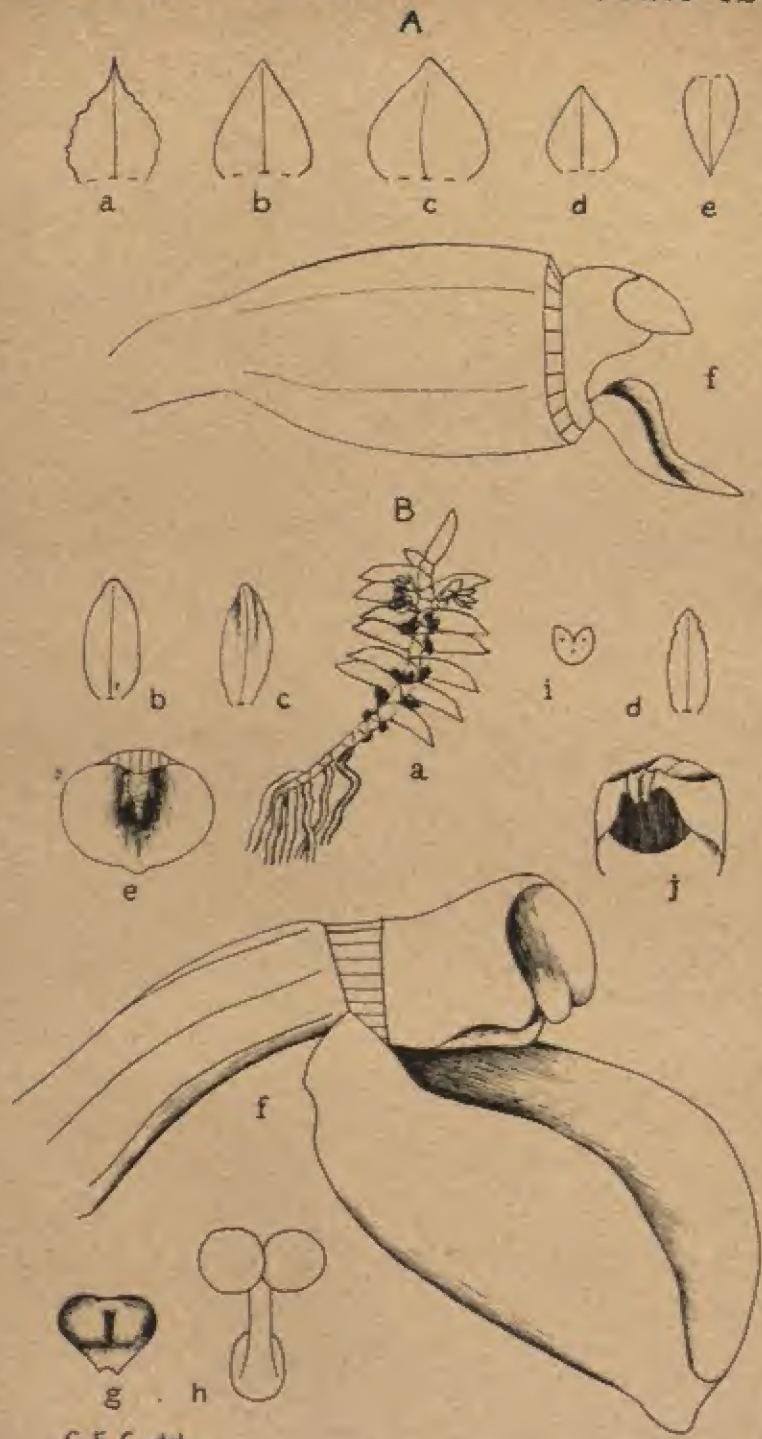
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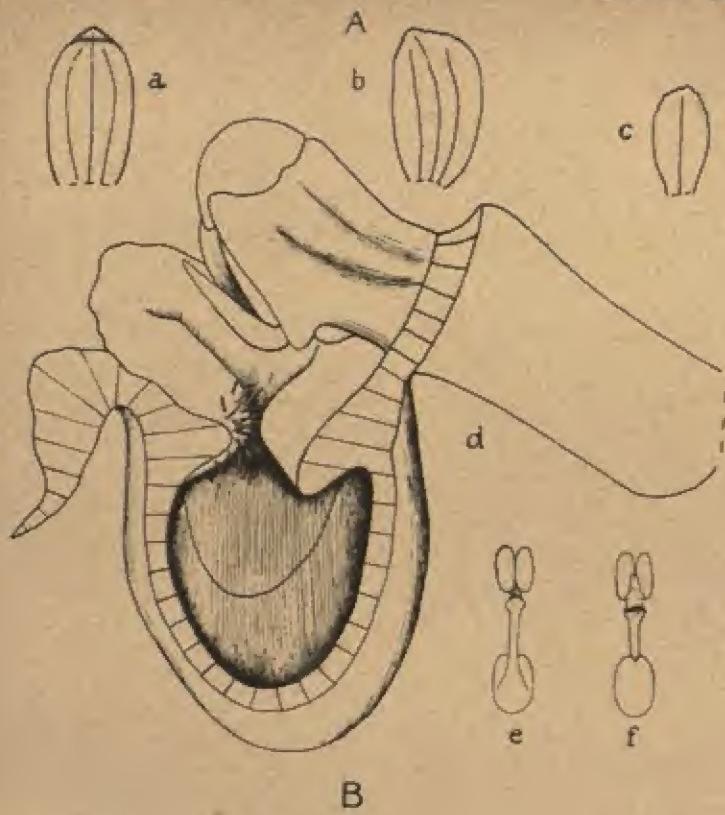


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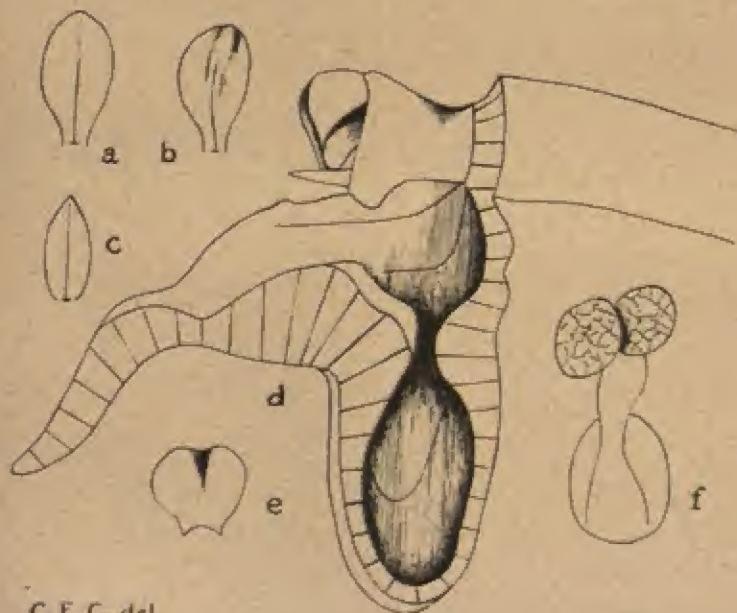








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HIKAYAT MAHARAJA RAVANA.

By H. OVERBECK.

Hikayat Sēri Rama, the Indonesian version of the Indian Ramayana, which has often attracted the interest of Oriental scholars, during recent years has again been the object of profound research regarding the origin of its different elements and their parallels in other Oriental literature and folklore. Two important works have been published, Dr. W. Stutterheim, *Rama-Legenden und Rama-Reliefs in Indonesien* (vol. I text, vol. II plates), Munich 1925, and Dr. A. Zieseniss, *Die Rama-Sage bei den Malaien, ihre Herkunft und Gestaltung*. (Publications of the Hamburg University), Hamburg 1928. In these works (both with a complete bibliography) nearly all known editions and manuscripts have been fully discussed. Moreover Dr. R. O. Winstedt has summarized a Patani version in the Feestbundel of the Batavian Society, deel II, pp. 423–435, (Weltevreden, 1929). There is however a manuscript in the Preussische Staatsbibliothek, Berlin, called *Hikayat chēritēra Maharaja Ravana*,¹ which seems to have been overlooked. Probably it is more or less identical with cod. 1936 in Leiden, of which Dr. H. H. Juynboll in his catalogue (p. 47) has given a short description. Dr. Stutterheim mentions cod. 1936 (l.c., I, p. 247), but does not give details. The Berlin version, though apparently late (Rama and Sita make love in pants, and Hanuman's tail, when he sets fire to Langkapura, is drenched with petroleum!), contains interesting particulars, not mentioned in Dr. Juynboll's account of cod. 1936, Leiden.

The manuscript, which bears no date, is written, or more probably copied from another manuscript, by a very careless writer, who worked mechanically and probably never took the trouble to read again what he had scribbled down. When he came to the end of a line and found a word divided, he copied it in two parts, and when he did not know the word he copied, he just wrote down something which resembled it. Towards the end of his work he seems to have lost patience altogether, hence many gaps. Of the spelling of the proper names he has made a worse havoc than usual.

There is a sprinkling of Javanese words (*gēgaman*, *upachara*, *anom*, *likor*, *ilat*, *sivalan*, *Ratu Mas*, *Raden*), and besides the slight Mohamedan varnish known also from other Malay versions of the *Hikayat Sēri Rama*, some other Arabian words occur, not always written correctly. The spelling occasionally is that of Minangkabau, *bari* for *bēri* etc. A number of words I have been unable to trace; they may be misspelled beyond recognition.—I regret I had not the time for a comparison with cod. 1936 Leiden, which possibly would have enabled me to correct many mistakes.

¹ Nr. Sch. V, 4, see my list of Malay MSS. in vol. IV, part II (Oct. 1926) of this Journal, p. 235.

In the synopsis I have rendered as shortly as possible those passages which are well-known from the published versions of the *Hikayat Sēri Rama*.—From the abundant choice of varieties of proper names I have selected those already known from the published versions, or the most pronounceable.

There is a mighty king of the Jins, Brahma Raja; the name of his country is Damarpura. He has seven sons, the eldest is Mangku Sētia, the second Chitrabaha, (the others not mentioned). At a feast Brahma Raja asks if there are any countries not yet subject to him. His ministers know of none, but by the will of Allah there are two women in the hall who cry out that there is such a country. It lies in the East, at a distance of seven months' journeying, is called Siladarpura and ruled by king Dētikocha (دِتِيكُچا): he and his subjects are rakshas. Brahma Raja's sons and officers are afraid of the rakshas. Only Chitrabaha offers to conquer Siladarpura, and succeeds. (The story of the raksha-spies who kill many of Chitrabaha's troops by licking their footprints, but by a ruse are made to lick their own and kill themselves, is also mentioned). Chitrabaha kills Dētikocha, and returns to his father, carrying with him princess Raksha Pandai, the daughter of Dētikocha and Manda Putēri. Chitrabaha marries princess Raksha Pandai, and she gives birth to a son, Ravana, who according to the astrologers will be a mighty ruler, but not in his father's kingdom. Princess Raksha Pandai further gives birth to Kumbakarna, Arya Bibisana and princess Sura Pendaka. As Ravana through his unruliness becomes a danger to the dynasty, he is banished to Langkapura. After the death of Brahma Raja, Mangku Sētia ascends the throne but dies after a reign of five years. Chitrabaha rules for seven months only, and after his death Mentēri Raskas (رَاسْكَسْ) rules Damarpura (also called Dewapura). (p. 1-11).

Ravana on Langkapura practises austerities, collects firewood during the day and sleeps in the night hanging over the fire, head down, like a love-bird (*sērindit*). After twelve years Allah sends down Adam to find what Ravana wants, and "his heart trembling like a dry leaf on which the wind blows," Ravana asks for rule over the four worlds, of earth, air, water and the nether world. Allah grants his wish on condition that Ravana angers nobody, and does not steal women; if he breaks the covenant, Allah's curse will fall upon him. (When delivering the message, Adam omits the stealing of women). Ravana agrees, conquers the four worlds, marries the princesses there and leaves his sons by them as rulers, Indrajit in the Keindéraan, Gangga Mahaya Sura in the sea (its original ruler, Batara Gangga, yields to Ravana, but is not killed), and an unnamed son in the lower regions. For himself Ravana builds an immense town on Langkapura: his brothers Kumbakarna, Arya Bibisana and his sister Sura Pendaka live with him. The town is surrounded by seven concentric walls, at a distance of

three days' journey each, and is peopled by rakshas and jins. (p. 11-15).

There is a king called Dasat Raja (Dasarata), the son of Dasat Raman, the son of Dasat Chēkar (چکر), the grandson of Adam. Dasarata is the only human being in his realm, his subjects being jins and peris. As Ravana's kingdom is only three months and three days distant, Dasarata fears trouble with his neighbour and decides to establish a new kingdom further off. After long wanderings a suitable site is found. Dasarata fells a large bamboo which always grows again when cut down by anybody else; and in it he finds a beautiful girl. She Bandudari is (Mandudari) the daughter of a prince in the abode of the gods (*kēindēraan*) was separated from her parents at her birth during a thunderstorm, and has never seen them again, having lived all the time in the bamboo. Dasarata takes her to his queen Rētna Dewi.

When the building of the new town is finished, Dasarata has a bathing pavilion erected, seven stories high, and after being carried in procession seven times round the town, ascends the pavilion with Mandudari. The pavilion leans to one side (and threatens to tumble down). In vain the princes and grandees try to put it right, and Dasarata feels much ashamed. (Here is a gap in the text, which could be filled in, partly from the following text, as follows: Dasarata is not only accompanied by Mandudari, but also by Rētna Dewi, and Mandudari succeeds in putting the pavilion right again, perhaps, as in the story of the sedan-chair in other versions of the *Hikayat Sēri Rama*, breaking her hand in doing so.—Afterwards Dasarata falls dangerously ill, and none can help him). The princess (Mandudari) fasts for three days and obtains from the gods the fulfilment of her wish. She strokes the king's body, the morbid matter assembles into an ulcer, and with the outflow of much pus the king's sickness disappears. Dasarata informs his elder queen that he has promised the younger queen, who formerly had put the bathing-pavilion right and now has saved his life, that her son, if she bear one, shall be heir to the kingdom. Rētna Dewi thinks that Dasarata has no consideration for her feelings. In time the two queens give birth to a son each, and later again a son is born to each of them. Of Mandudari's sons the eldest is born with an arrow in his left hand, the youngest with a sword in his hand. Astrologers tell Dasarata that the sons of the elder queen will be lucky kings; those of the younger queen will not stay in the country, but when they have become mighty rulers, will meet their brothers again. The sons of the elder queen should be called Bardan and Chitradan, those of the younger queen Sēri Rama and Lasmana.¹ The king names them accordingly, and the boys are brought up together. (p. 15-19, not always quite clear).

¹ Later also called Laksamana.

Ravana, sitting on the *maidan* with his brothers, Patih Jembawan and his grandees, asks if they have heard that king Dasarata of Mandurapura has found a beautiful princess in a bamboo. A menteri, Rētna Sudaka, who is related to Dasarata's queen (Rētna Dewi?) confirms the news. Ravana proceeds in his flying car to Mandurapura, appears in the audience-hall of Dasarata, causing great consternation, and has the king summoned. Dasarata, "his heart trembling like a dry leaf upon which the wind blows," comes, bows low before Ravana and offers him *sireh* and *pinang*. Ravana asks: "Is it true that thou (*engkau*) hast found a wife in a bamboo?" Dasarata, dismayed, answers that she has already borne him two children. Ravana: "And if it had been twenty, I would have taken her: so much the more if it is only two." Dasarata, crying, takes Mandudari on his knees and tells her they must part. He explains; Mandudari replies that perhaps the gods will help them; Dasarata should ask Ravana for three days' grace, but should not come back to her. Dasarata explains to Ravana that Mandudari cannot yet part from her children. Ravana laughs and agrees, but Dasarata shall stay with him, as otherwise he would sleep with Mandudari, who is now his, Ravana's, wife. When the three days have passed, Mandudari appears and Dasarata, his eyes full of tears, tells Ravana that this is the princess. Ravana takes her to his flying car and disappears. Dasarata faints.

Ravana, passing a high mountain, sees a *Maha-rishi* who deep in his devotions, does not notice him. Ravana becomes furious, his ten heads appear, and angrily he asks the rishi if he does not know that it is he, Ravana, ruler of the four worlds, who is passing. The maha-rishi replies that he did not know Ravana. He makes the *sembah*, telling Ravana that he will not be a ruler much longer, as he has broken the covenant with the Lord of the World by carrying off another's wife. Ravana heeds him not, but the curse of God (*kutuk*) and the curse of the Maha-rishi (*sumpah*) has fallen upon him.¹ "And the Almighty created Hanuman (*Maka di-lahirkan Hanuman itu oleh yang Mahakuasa*)."² Ravana returns to Langkapura, and his brothers and grandees are glad that he has found a wife on earth at last. Ravana orders a palace to be built for the princess and begins festivities that are to last for twenty-eight days.

Dasarata, awaking from his faint, goes crying into Mandudari's room and finds her with her children on her lap. She explains that when he had left her, she had cleaned herself, had obtained a lump of *daki* as big as a hen's egg, had killed a *pērawa* (lizard? Jav. *pērawan* = a virgin?) and by offerings (*puja*) had created, with the help of the gods, a princess who resembled her, and whom she had given to Ravana. Dasarata is troubled, as he promised to

¹ To ask or accept a *sembah* from a person higher in rank than one self (in this case of the maha-rishi) exposes one to the danger of the *tulak*-curse.

Ravana to give him his wife who had already borne him children. He calls for Nēnek Kēbayan and proceeds with her to Langkapura, where the old woman sells flowers, and Dasarata assumes the shape of a little boy, her grandson. The old woman sells flowers in the palace of the princess, feigns to be intoxicated by the betel she is given, falls asleep and awakes only in the afternoon (*waktu asar*). The princess keeps them in the palace, the child to sleep with her. In the night Dasarata assumes his natural shape, explains matters to the princess, and she yields to his wishes. When he leaves her, Mandudaki (as the princess is now called), cries.¹ (p. 19-25).

Ravana and Mandudaki are married. A daughter is born; the astrologers prophesy that she will destroy Ravana's kingdom and must be called Sita Dewi. The child is put into an iron-coffin, rather too small for her, and is thrown into the sea. Maharaja Kala Rishi, who standing in the middle of the sea is worshipping the sun in order to obtain a child, finds the coffin and the child and brings her up. He plants forty Siwalan-trees² in a row: whoever shall be able to pierce them with a single arrow, shall be Sita's husband; that shall be her price (*harga*); gold and silver he does not want. When Sita is seven years old, princes from 39 (40) countries come to ask her in marriage, but none can pierce the forty trees with a single arrow. Kala asks Dasarata for his son to take part in the trial. Dasarata gives him Bardan and Chitradan (here called Chintabardan), of whom Bardan will be heir to the throne. They accompany Kala, who tells them that there are two roads to his country, one that will take them three months and be free from danger; the other that will take them three days, but is infested with a raksha, a dragon (*naga*) and a tiger (*machan*). Bardan and Chitradan choose the safe road, and Kala brings them back to Dasarata, who gives him Sēri Rama and Laksamana. These two choose the shortest route. Rama finds the demon (*buta*) sleeping, but "if I should kill him in his sleep, I would not be the son of my father Dasarata and my mother from *Kēindēraan*." He wakens the buta and kills him, kills also the dragon and the ferocious monkey (here *bērok* instead of *machan*). They arrive safely in Kala's capital, where the beauty of the two princes astonishes everybody. Kala tells his wife and Sita of Rama's deeds, and his wife asks him to take care of Rama and his brother, as they are the only princes who will

¹ This version thus "explains" why Dasarata follows Mandudaki and sleeps with her. Sita becomes the half-sister, or considering the creation of Mandudaki, an even nearer relation of Rama. It is obvious that Rama's wife could not be the daughter of a raksha. The Malay version accords thus to Rama the "sacred marriage," i.e. that of brother and sister, in old mythology the prerogative of gods and royalty. Compare Zeus and Hera, Isis and Osiris, the mythology of Sweden, Persia, Peru etc. In Egypt the marriage between brother and sister was observed by the Ptolemaic dynasty down to the time of Cleopatra. (E. Georg. Verschollene Kulturen, Leipzig 1930, p. 140).

² Siwalan in Javanese is the fruit of the lontar-palm.

stand by him. Kala sends Dang Lela Suganda and Dang Lela China (Sina) to invite Rama and Laksamana to his palace, where festivities of seven days are held. On the eighth day Rama and Sita see each other by chance, their eyes meet and the maids comment in pantuns, to which Sita replies. Kala informs Rama of the conditions of the trial. Rama steps down from the audience-hall; Laksamana, sword in hand, is at his brother's side. Rama's arrow cuts through the forty lontar-trees. The other princes plot to waylay Rama when he returns with Sita to his father. Kala informs Rama and Laksamana that Rama has won Sita, that he wants their help in a matter which he is ashamed to disclose yet. Kala is afraid of the other princes. His wife opines that he is bound to give Sita to Rama, but should not hurry the marriage. The next morning Kala goes to collect tribute in neighbouring villages; on his return he invites Rama and Laksamana to his palace. Sita withdraws into her room, embraces her pillow (كکل?), sings pantuns with her maids and is very much in love:

*Dari mana terbang-nya mérak,
Permata¹ jatoh ka-apí,
Dari mana mula-nya hendak?
Dari mata turun ka-hati.*

Kala asks Rama's help. He has two large tanks near Sita's bathing-place, which he wants to fill with milk and honey, but a huge raven, Mahaya Sura, always empties them in a single draught, and also eats many of Kala's subjects. Rama's arrow follows the raven who promises never to drink again from those tanks, to do all that Rama may desire, and to help Rama in every way. The arrow reports to Rama, and Kala is satisfied, but asks to delay the marriage for a month in order to collect tribute from the country. Rama agrees, but is very much in love, and Kala, thinking that Rama with his power may easily obtain Sita, bids the latter hide amongst the idols of a temple. Sita obeys, though she does not understand. Rama neither eats nor drinks and fears that Kala will cheat him; Laksamana calms him. Rama and Laksamana sit down in Sita's bathing-park, and Sita sends Dang Lela Suganda to ask him for medicine and to bring him her betel-box (with cigarettes), a letter and her ring. In the letter she asks for help and medicine:

*Orang kerekut di-pinggir laut,
Tému-tému di-dalam puan.
Sakit ini antara maut,
Hendak bertému pada-mu tuan.*

And further:

*Jika sulaseh menyulaseh,
Rakit-rakit di-batang bemban.
Kakanda kaseh, adinda kaseh,
Méminta obat hati yang dendam.*

¹ The text has "périmata."

Rama cries when he reads the letter; Dang Lela Suganda smiles and opines:

Rakit-rakit di-dalam pēti,
Jēlotong daun angsana.
Jangan tuan bersakit hati,
Pētang hari pergi kasana.

Rama replies:

Sulaseh daun angsana,
Jēlotong padang di-padang tēmu.
Badan kaseh, pergi kasana,
Pētang hari kita bertēmu.

But Dang Lela Suganda advises:

Jikalau las di atas gēta,
Gunjai di-karang akan destar.
Lus-las tuan berkata,
Jangan hilang nama raja bēsar!

Rama sends Sita his ring and promises to come. In the evening, following Laksamana's advice, Rama, accompanied by his brother, looks for Sita in the temple, strokes the eyes of the idols with a chempaka-flower and finds Sita by her winking. He carries her into his sleeping-room and promises to give her the medicine she desires:

Lēgundi di-rumah Dang Lila.¹
Sēhab tuan, karna tuan,
Hilang budi, menjadi gila.

Sita smiles and replies:

Kain chēlari panjang puncha-nya,
Di (pakai) budak turun mandi.
Laki-laki sahajakan dusta,
Kētika hendak turutkan mati.

Kala, informed of what has happened, orders a bathing-pavilion fifteen stories high to be built and festivities to be prepared. Laksamana paints the pictures on Sita's sedan-chair. Dasarata is invited and comes, and the wedding takes place. The young couple is carried in procession seven times round the town and bathed in the pavilion. During the ceremony of partaking of the *nasi adap-adap*, several birds, a *nuri*, a *bayan*, a *rajawali*, etc. sing pantuns. Rama and Sita are very happy; Dasarata returns to his kingdom. (p. 25-40).

Some time afterwards Rama wants to return to his father with Sita and Laksamana; he declines the guard of three thousand men which Kala would give him. They are waylaid by the disappointed princes. Laksamana says that Kala has foretold this

¹ First line missing.

attack and asks permission to fight with the enemies. He sends his sword to ravage the enemies by itself, Rama sends his arrow, and the enemies are thoroughly beaten. Rama decides not to return to his country, as Dasarata has given the kingdom to Bardan and Chitradan. They wander through the forest, and whilst Laksamana goes to visit a maha-rishi on a high mountain, Rama goes with Sita in search of water. They find two ponds: in the first the water is troubled, in the second it is clear. Rama and Sita bathe in the clear water and are turned into monkeys.

Laksamana meets the Maha-rishi, and is told to warn his brother against the two ponds; whoever bathes in the clear water, is turned into a monkey, but can regain his human shape if he bathes in the muddy water. Laksamana runs back and finds Rama and Sita turned into white monkeys. He rushes back to the Maha-rishi, begs some ripe bananas, snares with this bait the two monkeys, ducks them into the muddy water, and Rama and Sita regain their human shape.

Now comes the story of Bēgawan Gotama, who is married to a nymph of the Kēindēraan, but leads an ascetic life. His wife secretly visits the Kēindēraan and commits adultery with Batara Guru. She gives birth to two sons, Bali Raja and Sugriva, and to a daughter, Dewi Anjani. Once when Gotama is teaching his children, Dewi Anjani tells him that she only is his real child, her brothers being sons of the Bataras of the Kēindēraan. Gotama reproaches his wife, who answers that he has been listening to a child's babble. Knowing the nature of the two ponds, Gotama decides to make the test, throws his two sons into the clear water and entreats the gods to reveal the truth: if the boys are not his children, they should turn into pig-tailed monkeys (*bērok*). Bali and Sugriva turn into monkeys; Gotama returns with them to his wife and sends her back to her parents. She curses Dewi Anjani that no man shall look on her with favour (*jangan berkēnan kapada laki-laki*), that she shall neither eat nor drink and that her mouth shall stand open. Dewi Anjani betakes herself to the middle of the sea. Bali and Sugriva run away into the jungle, reach Ligur, the country of animals that live on trees like *kēra*, *bērok*, *lutong*, *siamang*, *kukang* and others, and Bali through his strength and braveness becomes their ruler.

Rama asks Laksamana about his behaviour when a monkey; Laksamana replies he dare not tell him. Rama understands, massages Sita's body, the *mani* appears and on a bimar-leaf (भिर) is given to the wind-god (गव्य देव — Batara Bayu?). Rama says, whatever it may become, man or ape, it should wear ear-pendants. The wind-god drops the *mani* into the mouth of Dewi Anjani. She becomes pregnant and is able to speak again, returns to the shore and in due course gives birth to a monkey, Hanuman. When four years old, Hanuman will provide for his mother and himself;

Dewi Anjani tells him that a redness of colour is the sign that a fruit is ripe. One morning from the top of a mountain he sees the red sun rising, thinks it a fruit, runs after it from the East to the West, and at last meets the angels that are pulling the sun-disk (*malaikat yang mēhela jentēra matahari*). He seizes the rope of the disk (*tali jentēra*), and says that he wants the red fruit. The angels explain that this is not a fruit, but the sun (كُلُّ اعْلَم): they pull quickly. Hanuman falls and is crushed to death by the sun-disk. The angels do not know what to do: their carelessness in pulling the sun-disk (*karna taksir mēhela jentēra matahari ini*) having caused this accident. Evening comes, Dewi Anjani cries the whole night in fear for her son, and in the morning goes to the spot where the sun rises. The angels inform her that a little monkey has been crushed to death by the sun-disk; Dewi Anjani, inconsolable, would die the same death as her son. The angels report this to God (*ka-hadzrat Allah taala*), who orders the bones of Hanuman to be collected and bathed in the Water of Life (ماء الحياة). Hanuman comes to life, and will not die, because he has been bathed in the Water of Life. He returns to his mother, is told what has happened, visits his uncle Bali and goes back to his mother. (p. 40-46).

Rama, Sita and Laksamana have found a suitable spot in the jungle which they make their abode.

Ravana makes a pleasure-trip to the Padang Anta Tērahi (Bērahi?). In his absence Buta Lengkawi, the husband of Ravana's sister Sura Pendaka, guards the town; during the night he coils his tongue three times round the city. Ravana returns late at night, sees the tongue, takes it for a large snake, cuts with his sword through the three coils, and Buta Lengkawi dies. Ravana has him buried with due honours and excuses himself to his sister that in the darkness he had not known what the thing was. Sura Pendaka thinks that Ravana with his magic powers must surely have known; she tells her son that Ravana has killed her husband on purpose and is sure to kill him also; she therefore brings him to the main-land and bids him lead an ascetic life in the hollow of a large bamboo clump.

Laksamana, cutting wood with his sword, unintentionally cuts off the head of Sura Pendaka's son. His mother finds the body, goes in search of the murderer and finds Rama and Sita. She falls in love with Rama, asks him to marry her and is referred to Laksamana, who is still unmarried and lives on the bare ground, having no hut. Sura Pendaka finds him sitting as if in the presence of a king, looking neither to the left nor to the right, his sword at his side. He is deaf to her words and doings and folding up her *kain* she carries him to the top of a hill. With his sword Laksamana cuts off her nose, and Sura Pendaka flies back to Langkapura and hides in her room.

Three years and three months later Ravana remembers his sister, goes into her room and sees that her nose is cut off. His ten heads appear, he assembles his council and declares that he will carry off the wife of Rama, as the latter has insulted him. With his two *mentéri*, Renta (Rētna?) Sudaka and Wartana he goes in his flying car to a place near Rama's abode. The *mentéri* turn into gold- and silver-coloured deer (*kijang*) and sport near Sita's hut. Sita wants the deer; when Rama warns her that they are not real deer, she cries, stamps and rolls on the ground. Rama warns her again that these deer will be the cause of their being separated: Sita should look for another husband and not long for him, Rama, any more. Sita heeds him not, and Rama entrusts Laksamana with the care of Sita, as she wants Rama no longer for her husband. Rama follows the deer far into the jungle. Ravana, with Rama's voice, calls for help. Sita forces Laksamana to follow Rama; he draws a circle round the hut to protect her. Ravana in the shape of an old man asks Sita for some burning sticks (lit. fire), as he has neither eaten nor drunk for three days. As he cannot pass over Laksamana's circle, Sita puts her hands outside the circle, Ravana seizes her and carries her off in his flying car. Sita cries out; a nymph tells her that it is not Rama's fault but her own. The bird Jentayu, the mount of Batara Vishnu, tries to rescue Sita, but is vanquished in the fight with Ravana and falls down on the bank of the river Purahala. Ravana reaches Langkapura with Sita, but she does not yield to him, threatening to kill herself as soon as Ravana approaches her. (p. 46-52).

Rama has killed the deer; on his return he meets Laksamana and reprimands him for having left Sita. Laksamana explains, Rama faints: when he recovers, they return to the hut. Finding Sita has disappeared, Rama behaves so foolishly that Laksamana has to admonish him to be a man. They begin the search for Sita (description of their wanderings, of the animals they see, of a thunderstorm they meet, etc.); their first rest is on a high mountain where birds and flowers talk in pantuns and inform Rama that Sita is in Langkapura. Rama wonders where that place may be. The oily and undrinkable water of a rivulet leads them to Jentayu who informs Rama of what has happened and that Sita does not suffer Ravana to come near her. Jentayu dies and is buried. On another mountain they meet the bird Sura Bērahi, with a human face, who greets Rama with a *pantun*, which is answered by the bird Bait (بیت) with another *pantun* to the effect that if Rama's love is true, he will conquer Langkapura. The birds sing with human voices, and the bird Sura Bērahi, confirming that Sita does not suffer Ravana to approach her, invites Rama to stay for some time on this lovely mountain called Penglipur Lara, with its pond called Si Mendam and its shore Pengasih Hati, the bathing place of seven nymphs. Rama stays there with Laksamana, giving himself up to his longing for Sita. (p. 52-54).

Bali Raja is practising ascetism in a cave. A mighty raksha, Mangku Buwana (also M. Buat, Buta, Bulang), who has five hundred wives, is living near by. In his country are (growing?) big heaps of magical bones (تُرْجُونَ سُنْجُونَ), and if he is angry, which happens about every three months, he throws them into the sea with his big toe, and his country becomes level again. Once he amuses himself with his wives and children in the sea. He lies down to sleep at the mouth of the river Sungai Batu Algar (سُنْجَى بَاتُو أَلْجَار), or "bēnua Ligur," which is Bali's realm?), the water is stowed up, inundates the country and disturbs Bali in his cave. Bali proceeds to the top of the hill, sees the sleeping raksha and goes to him, accompanied by his servant Sēnawangga (سَنْوَانِكَ), also Sentuwangku, Sēnungga etc.). Of the four raksa-mentēris who guard their master's sleep and will not suffer the monkey (*bērok*) to disturb him, Bali kills one and hurls the others far into the hills. Great consternation amongst the wives and children of the raksha! Mangku Buwana awakes and begins the fight with the monkey-hermit. They fight with magical powers (the raksha gets one thousand heads, two thousand arms, one thousand legs; Bali turns into an iron fort so that the water does not harm him etc.) until the evening. Bali's servant is exhausted, Bali comforts him, jumps on the shoulders of the raksha, seizes him by the hair, bites through his throat and drowns him in the sea. He takes the wives and children of Mangku Buwana home, marries them and lives happily with them and with his brother Sugriva.

A coiled-up snake (*ular bēlingkar*) drops from a mountain-top into the river of Ligur and closes it up so that no water comes to the city. Bali sends Sentuwangku (see above) to find out what has happened. Sentuwangku sees the snake, hurries back in blind fear and reports. Bali issues forth accompanied by his princes, most of whom run away with Sentuwangku when the latter has pointed out the snake. The snake is asleep: Bali kicks it, as it is beneath his dignity to kill it in its sleep. The snake uncoils and the stowed-up waters rush down, carrying trees and houses with them. Lashing with its tail, trying in vain to get a hold on the trees which are uprooted, the snake goes to an open plain for the fight. Bali jumps on its head, but is thrown off; Nila and Anggada have no better luck. Bali recognizes the magic power of the Bengkar-snake and fetches a branch of a *waringin-tree*, saying: "This is thy death, this branch of *waringin* from mount Mahadewi, thy place of practising ascetism." He smashes the snake's head. Although Mount Mahadewi is three days' journey distant from the spot where the fight took place, Bali covers the distance in a single jump. On his return to his capital Bali orders Sēnawangga to do the round of the town thrice every day and night.

The buffalo Ahmak, accompanied by his wife (*istéri*), comes to Ligur,¹ and though his wife warns him that Bali has already vanquished the raksha Mangku Buwana and the snake Bengkara, Ahmak runs to the town, and meeting Sēnawangga on his round, through him challenges Bali. Bali accepts, the fight to take place in a cave, as the buffalo fears that on a plain Bali will run away. Bali bids Sugriva to close the five openings of the cave and watch outside. If red blood flows out, the buffalo is killed; if white blood, Bali is killed, and Sugriva must take care of Bali's wives and children and subjects. Bali enters the cave where Ahmak is waiting. The fight lasts from the morning until evening, when red blood mixed with white flows out, and Sugriva, thinking that both have perished, closes the cave with big rocks, returns to the town and takes possession of Bali's palace and throne. Bali, having killed the buffalo, finds the cave closed up, suspects Sugriva of bad faith, smashes the rocks, hastens to the town and bitterly reproaches Sugriva. They fight, and Sugriva is hurled away. He drops on a tamarind-tree and gets jammed into the fork of a branch, unable to move.

Rama and Laksamana have met the seven nymphs who confirm that Sita is in Langkapura. They wander further and after seven days rest under a tamarind-tree, Rama sleeping with his head on his brother's knees. Sugriva, seeing these two brothers united like the nail and the quick (*kuku dengan isi*), while he and Bali are like a dog and a pig, begins to cry. His tears drop down and awake Rama, who reproaches Laksamana for having cried. Sugriva says that it was his fault, comes down and makes himself known to Rama. He persuades him to kill Bali and ascend his throne, as with Bali's army Rama will be able to conquer Langkapura, which is only three days and three nights distant. Rama, understanding Sugriva's intentions, promises to kill Bali when he fights with Sugriva. The latter challenges Bali, they fight, and Sugriva is vanquished, as Rama has been unable to discern one brother from the other. On Rama's advice Sugriva marks himself with lime. They fight again. Rama shoots his arrow, Bali sees it coming and grasps it, asking how the son of a king could interfere in this fight between two royal brothers; Rama and Laksamana come forth, much surprised, and make the *sembah* before Bali. Rama relates all that has happened and asks that his arrow be returned to him. Bali laughs and says that he knows that Rama has come hither because of Sita, but he will grant Rama's and Sugriva's wishes. He tells Rama that he, Rama, is the incarnation of Vishnu, and refuses to return the arrow before it has fulfilled Rama's wish, as the arrow has been transferred by Vishnu into the womb of Rama's mother. (*Di-panah-nya serta di-dalam bondamu*; I read: *di-béri panah-nya serta etc.*). He leaves to Rama, and not to Sugriva, his realm and his army, but Rama should not

¹ The former history of the buffalo not mentioned.

kill Sugriva. Bali then calls together his grandees and warriors, in spite of Rama's entreaties throws the arrow into the air, turns round, the arrow pierces his back, and Bali dies. Rama has him buried with due honours, enters the town and is crowned by Sugriva. (p. 54-62).

Rama will send a messenger to Langkapura. It is an island, seven months distant, and his new subjects have no ships, as being animals they do not know how to build them. Rama and Lakshmana laugh and ask how far they can jump. Sugriva can cover a distance of ten days, Sénawangga that of a month. Hanuman appears; Rama asks who the little monkey with the ear-pendants may be? Sugriva says he is called Hanuman and has no father. Rama remembers and thinks Hanuman is his son, but is ashamed to say so. Being asked whether he can jump to Langkapura, Hanuman enquires what Rama will give him for it. Rama promises him whatever he desires; Hanuman laughs and says he has no want. Rama promises Hanuman to acknowledge him as his and Sita's son if he accomplishes the task. Hanuman accepts, but asks to eat together with Rama, which would enable him to do the jump; if a man has children, he does not hate them, whatever their shape may be. Rama smiles and agrees. Hanuman has very long and very black nails, and his teeth are very unclean. They eat from the same banana-leaf, but the sweet sauce stops all in one place, and Rama scratches a line on the leaf with his nail, so that the sauce can flow to other places also, and that is the reason why banana-leaves have grooves (*bersungai*). Rama forbids Hanuman to bring Sita away; he must only find out where and how his mother may be. Having tried in vain a tree and a mountain, Hanuman jumps off from Rama's hand and lands just before dawn in Langkapura. His *mani* falls into the sea and is devoured by the daughter of the king of the fishes.

Sita dreams in the night that her husband comes and kisses her. She awakes, dawn comes, and her birds prophecy in pantuns that Rama will soon come. Hanuman, in the shape of an old woman, meets Sita's maids at the well where they fetch bathing-water for their mistress, and drops the ring which Rama has given him into one of the jars. When the jar is emptied over Sita's head, the ring falls out, Sita recognizes it, has the old woman fetched and offers her food; she is ashamed to eat before the maids, and asks Sita whether she may eat behind the bed-curtains. Sita agrees and follows her. Hanuman assumes his monkey-shape and calls her his mother. He presents himself as Raden Hanuman and delivers his message. Sita remembers her monkey-adventure. She swears to remain faithful to Rama and dismisses Hanuman. He finds a mango-tree, guarded by many rakshas, the fruit of which are the only food of Ravana and his wives; if there are none, they do not eat at all. During the night Hanuman eats all the ripe fruits of the tree, destroys the rest, uproots the tree, puts it

upside down in the ground and sits down on the roots. He allows himself to be captured and is brought before Ravana. A merciless beating, in which Ravana also takes part, does not harm him, and on his own advice his tail is wound round with cloth—Hanuman growing bigger and bigger during this procedure—drenched with petroleum (*minyak tanah*), bestrewn with saltpetre (*séndawan*) and set on fire. Hanuman jumps away, burns down half the town of Langkapura, causing great loss of life, (and returns to Rama). (p. 62–67).

Hanuman meets Rama in council with Laksamana, Sugriva and the monkey-princes, reports, delivers Sita's ring and is reprimanded for setting fire to Langkapura. The animal-army is called up, presents are distributed, and Rama orders a dam (*tambak setubanda*) to be built from Ligur to Langkapura. Under the supervision of Laksamana and Sugriva the work is begun. The animals of the sea, greatly disturbed, report to their king. Ravana's son Gangga Mahaya Sura, who being informed by Gangga Suaraha (سوارا، also Gangga Sura, see below) that Rama's army is so immense that if every animal only brings a handful (of earth) he will not need them all (to finish the dam), orders a big crab to destroy the dam. The crab pinches off large parts of the dam and throws them into the sea; many of Rama's army perish, being devoured by the sea-animals, and there is a great fight in the sea. Several times the dam is rebuilt, but always destroyed again. Rama is at his wits' end, and consults Hanuman, who says that he would have destroyed the crab long ago, but being reprimanded for his doings in Langkapura, has been afraid of acting on his own account. Rama explains that he has been angry with Hanuman because setting fire to Langkapura may have roused Ravana's anger and made him unwilling to return Sita, but now Hanuman may fight the enemy. Hanuman puts his tail into the sea, the crab pinches it, is hurled far inland and eaten by Rama's army. Gangga Mahaya Sura sends Gangga Sérayan (گانگا سرایان, also Térana) and the latter's wife to destroy the dam. They scatter the dam, causing great loss of life amongst Rama's army. The monkey-princes are unable to kill the rakshas, as for each head of the enemy which they bite off, two new ones appear, and besides, they cannot fight well in the water. Hanuman comes to the rescue, is thrown far inland, returns and wrestles with Gangga Sérayan, the latter's wife coming to help her husband, when furious fighting ensues, as all three are equal in courage, force and magic power.

Hanuman Turagangga (also Tugangga), the son of Hanuman Panchasona,¹ awakes from his sleep and asks his mother why the sea is in such an uproar. She tells him. He hurries to the place

¹ In the Javanese "Srat Kanda" the Panchasona is a charm giving long life, given by the gods to Bali, and by Bali to Hanuman after the latter's adventure with the sun. (Stutterheim, I.c. I, p. 74 and 77).

of fighting, tears with his nails the wife of the raksha to pieces and kills Gangga Sérayan. Hanuman Panchasona asks the youth who he is, and being told that he is his son from the *mani* dropped during his jump to Langkapura, embraces and kisses him and presents him to Rama.—The dam is finished, Rama leads his army to Langkapura, encamps, and after some festivities writes a letter to Ravana, which Hanuman, attended by three thousand mentéris, shall deliver. (p. 67–71).

Ravana informed that Rama has arrived with an immense army of monkeys, holds a council with Kumbakarna, Arya Bibisana, Patih Jembawan and others. Hanuman appears, is led into the audience-hall, delivers his letter, and unwilling to sit lower than Ravana, coils up his tail and sits down on it, so that he is above Ravana: Nila explains that Hanuman's tail is much longer than that of any other monkey. Rama's letter in very humble words ask for the return of Sita. Ravana replies that he would not give up Sita even to Batara Guru, much less to Rama. Sita is his wife; how could anybody ask him to give up his wife? Hanuman returns to Rama and delivers the message. Rama smiles; his body shines like the cloudless sky. He orders Sugriva to call the army, and war begins.

On the first day a nephew of Ravana, Maharana Radaksa, leads Ravana's army. The monkey-princes Kérangga Tula and his younger brother Sempati fight on Rama's side. Maharana Radaksa is killed by Sempati.

Ravana calls from the sea his son, Gangga Mahaya Sura, and bids him fight against Rama. Gangga Mahaya Sura entreats his father to return Sita to Rama, against whom he has already fought when the dam was being built. Ravana laughs at him. Gangga Mahaya Sura with his mentéris Sura Gangga, Indéra Gangga, Wira Gangga and Singa Gangga commences the battle, which lasts three months. His four mentéris are killed. For seven days and nights Gangga Mahaya Sura matches his magic powers with those of Hanuman and Hanuman Turagangga; when he has exhausted them, he runs and jumps into the sea. Hanuman Turagangga pursues him and pierces his breast with his nails of steel (*bési korasani*). Ravana mourns him three days and nights. Rama sends Anggada to ask for the return of Sita. Ravana refuses angrily and calls his son Pétala Maharayan from the nether world. By the power of God Most High (*dengan kudrat Allah taala*) Pétala Maharayan appears before his father, is told to fight against Rama, pleads in vain that Sita be returned to Rama, and adorned as for a marriage (*saperti orang hendak kawin*) brings his troops to the battlefield. The fight, "like the day of judgment," lasts for three months; his two leaders Sura Pétala and Wira Pétala, fall, and Pétala Maharayan is killed by Hanuman Turagangga in the same way as his brother.

Ravana mourns seven days and nights for him and then calls his son Indrajit (var. Indrajid). Indrajit also pleads for the return of Sita, as Ravana should not sacrifice hundreds of thousands of lives for a woman; besides, Ravana is breaking the law (*derhaka*) by trying to kill Rama. Arya Bibisana, who by astrology has found out that Ravana's intentions will lead to no good, and Ravana's other brother join Indrajit in his entreaties. Ravana reprimands Arya Bibisana in a wild fury, draws his sword and would have cut him to pieces if Patih Jembawan had not seized his hand. The other ministers advise Bibisana to flee, and he goes to Rama. Sugriva and Hanuman, not without suspicion, lead him to Rama. Rama cannot understand how one can "kill his brother and bring to life his enemy" (*membunoh saudara-nya mengidupkan seteru-nya*), but Bibisana convinces him of the sincerity of his intentions and informs him that Indrajit will attack Rama on the following day. Indrajit by his magic power will create a hail of stones which will last for three days and nights; besides he has two magic arrows,¹ the one will turn into a big fire, the other one will turn into a rain of molten tin. Rama has the raven Gagak Mahaya Sura called and asks his assistance, which Gagak Mahaya Sura promises, bound by his former vow.

Indrajit begins with the hail of stones; Gagak Mahaya Sura spreads his wings and shelters Rama and his army; when the burden becomes too heavy, Rama and Laksamana clear the stones from his wings. Then the princes of Kéindéraan prepare for the battle. Most of them are dewas, but there are also raksha-indéras. Their leaders are Patih Jaya Indéra, Singa Indéra and Indéra Gangga. Under the cover of magic darkness their army attacks. Rama's army takes to cover, the leaders only continuing the fight. A tree hurled by Hanuman breaks open Kéindéraan; Hanuman himself kills many enemies, his son Hanuman Turagangga by magic power abolishes the fire and the rain of molten tin which Indrajit had created. The princes of Kéindéraan flee before Hanuman and his son. Indrajit pleads once more with his father for the return of Sita, but in vain, and returns to Kéindéraan. He bids farewell to his wife Retna Gémala and to his little daughter Retna Dewati, and fully adorned proceeds to the battlefield. Rama and Laksamana, also in full attire, come with the monkey-princes. Indrajit's arrow creates an immense army, which Hanuman scatters with the trunk of a tree. Indrajit challenges Rama, who accepts but unable to evade Indrajit's incessant arrows or to shoot back, is hit on the breast and faints. Laksamana carries him from the battlefield, Bibisana restores him to consciousness, and Rama returns to the fight. He and Indrajit loose their arrows at the same time; Indrajit's arrow tries to meet Rama's arrow, which escapes high into the air; Hanuman seizes Indrajit's arrow, breaks it and throws

¹ The text has *anak*, = *anak panah*?, though "sa-orang . . . sa-orang" is used for "the one . . . the others."

it into the Red Sea. Indrajit thereby loses his magic power, Rama's arrow pierces his back, and Indrajit dies on the battlefield. Gods, men and beasts mourn for his death; fighting ceases, Rama and Laksamana cry. Due obsequies are held; Indrajit's wife would kill herself, but her maids prevent her. Ravana is informed and faints. Regaining consciousness, Ravana calls his adopted son Butalawi and orders him to kill Rama and Laksamana. Having in vain entreated his father to return Sita to Rama, Butalawi marches with his army to the battlefield.

Rama is informed that Butalawi will fight against him; he does not use any weapons, as when he looks at his enemies, they perish like wax melts in the fire. Laksamana constructs a fort of mirrors (*kota chermin*); as Rama fears that it will be shattered by weapons or overthrown, Laksamana uses charms of which one may not speak. (*Maka Laksamana pun perbuat. Ada pun perbuatan ini tiada beroleh di-katakan; jika di-katakan tiada baik*). When the battle commences, Rama's army retires into the mirror-fort. Butalawi pursues them blindfold (*mata-nya di-babat dengan*

= *lawé*, Jav. a string of thread?), when near the mirrors *σγ* throws away the bandage, destroys the stragglers of Rama's army who had not the time to reach the fort, sees himself in the mirror and perishes like melting wax. The monkey-princes scatter his army. Ravana, crying and repenting that he has not followed the advice of his sons, mourns three days and nights for Butalawi and then orders his brother Kumbakarna to fight against Rama; he himself will follow.

With Patih Jembawan and the whole army of Langkapura Kumbakarna proceeds to the battlefield. Rama selects Laksamana, Sugriva and Hanuman to fight against Kumbakarna. A furious battle ensues (matchlocks, muskets, swivel-guns and cannons are mentioned). Laksamana releases his sword to ravage by itself amongst the enemies. With the monkey-princes he attacks "like mosquitoes" the body of the giant. Kumbakarna's arrow creates fire, which chases the monkeys away; Hanuman Turagangga, standing on one foot and with the will of God Most High, creates an iron fort, into which Rama's army retires. On the iron walls the fire dies out, and Laksamana sallies forth again. He takes Rama's bow, says to the arrow: "Half-brother,¹ eat thou the blood of my enemy," and shoots off Kumbakarna's arm at the shoulder, which falling down kills many monkeys. (Lacuna in the text). Kumbakarna's *χγ* (could this be Javanese *bokong* = buttocks) (shot off) ravage on their own account amongst the monkeys,

¹ The text has *anjing*, but it cannot be the Malay word for dog. *Anjing* in Javanese means "to enter into, to animate." I read *saudara anjing* which is a brother born by the same mother, but not from the same father. The arrow is born with Rama, being transferred by Vishnu into the womb of Rama's mother, see above.

devouring many of them, as they are very furious at being severed from their body. Rama says to the arrow: ("Half-brother, what becomes of the sails, if there is no mast?", and Laksamana shoots off Kumbakarna's foot, which also plays havoc amongst the monkeys on its own account. Rama says again (to the arrow): "Half-brother, if one sails and has no rudder, what does it look like?", and Laksamana cuts off with the arrow Kumbakarna's head, which also raves over the battlefield and which Hanuman tries in vain to catch. At last Laksamana's arrow pierces Kumbakarna's body, and the giant dies. Ravana repents his deeds; as he is doomed, his head and body begin to tremble. He proceeds to the battlefield, taking with him his most powerful arrow, the point ten spans long, fastened to a chain drawn by 800 horses, and challenges his enemy.

Rama has held a council; he is still willing to do obeisance to Ravana, if the latter should return Sita to him, but Bibisana opines that it is useless, as Ravana will force a decision to-morrow. Rama should beware of Ravana's weapons, which are of great magic power, blood being sacrificed to them.

The battle begins. Ravana's arrow creates a profound darkness; Hanuman, his face turned to the East, calls up a storm which disperses the darkness. For seven days and nights Ravana and Hanuman fight with their magic powers; Hanuman remains unvanquished. Bibisana warns Rama that Ravana will now use his most powerful arrow, and that Rama had better shoot first, as otherwise Rama will incur some danger, though of no serious consequences. (Here is, most unfortunately, another gap in the text; probably Rama shoots, Ravana falls, Hanuman jumps upon him and is hurled far away). A shout is heard on the battlefield that Hanuman has been killed, but he has only fallen into the sea, has risen in a wild fury into the air, appears again, a mountain in his left hand, seizes Ravana with his right hand, throws him into the sea and on top of him the mountain which presses him down. Rama's warriors raise a shout of victory that Ravana is dead, but it is said that he is still alive, and when the end of time comes, he will appear again, an enemy again to the will of the Lord of the Universe (*bersetéru pula dengan kahendak Tuhan Sarwa Sakalian 'Aalam*). (p. 71-84).

Rama enters the city of Langkapura, calls the subjects of Ravana, replaces the officials who have fallen, and puts the government in order. He sends Hanuman to Sita to tell her of the war and of the fall of Ravana. The fate of Sita, and whether anything has happened between her and Ravana, has often been discussed by the warriors and officials of Rama, and when Rama meets Sita in her palace and she would throw herself at his feet, he is embarrassed and refuses to take her back. Sita offers to undergo

the trial by fire. Rama bids Bibisana do as Sita desires, and Sita is put on the burning pyre. When the fire dies out, Sita is seen on a golden bed, purer and lovelier than ever. Rama quickly takes her by the hand and brings her into the palace.

Langkapura Rama gives to Laksamana. The different parts of the town, separated by seven concentric walls, are divided between Bibisana and the monkey-princes with their subjects. "Ravana however is not dead, the mountain covers his body only up to his nostrils, and if an animal or ship comes near him, he catches it by drawing in his breath so that it enters his mouth, and that is his food."

In spite of Rama's entreaties, Hanuman Turagangga returns to his country.

Rama has been seven months in Langkapura. A daughter of Ravana, Berkēgan Dewi (بکنگان دیو), has a picture of her father, whom she loved. She takes the picture to Sita, and finding her asleep, shoves the rolled-up picture into the folds of her dress. Rama finds Sita embracing and kissing the roll in her sleep, takes it from her, unrolls it and sees the picture of Ravana. He abuses her, and in spite of her protests that she is innocent, whips her and cuts off her tresses with his sword. Sita cries. Laksamana comes, and Rama orders him to kill Sita and to bring him her blood and her heart as proof. Laksamana opines that they should make sure first if there has not been foul play, but Rama becomes so furious that Laksamana takes Sita away to the place of execution. He spares her life, sends her with an officer in a ship to her father, kills a goat, has it dressed and buried like a human being, threatening death to his attendants if they should ever breathe a word of Sita still being alive, and presents the blood and the heart of the goat to Rama.

Sita safely reaches her father's country, is cried over by Kala and his wife, and gives birth to a boy whom Kala calls Janggapulawa. When the boy is three years old, Kala goes with him to his bathing-place, and when Kala dips into the water, the boy runs away to his mother. Kala thinks the boy is drowned and from seven flowers of *talang* grass his offerings create another boy exactly like Janggapulawa. Kala takes him to Sita and finds Janggapulawa with her. Sita accepts him as a second son. (Name not mentioned).

Rama dreams that Sita has been the victim of foul play, that she calls him and comes to sleep with him. He awakes, looks everywhere for Sita and faints. Laksamana holds him on his knees, and Bibisana restores him to consciousness. Rama says he is not ill but in love with Sita. Laksamana, rather ashamed at his brother's behaviour, replies that Sita being dead, where should he

look for her? Rama after several new fits of fainting says that if anybody will undertake to find for him a woman resembling Sita in everything, he (will give him a rich reward.—Lacuna in the text).

(Lacuna in the text: Dasarata has heard that Rama is still alive and has vanquished Ravana, and sends Bardan and Chitradan to Langkapura to fetch Rama?) Rama receives his brothers heartily, but will not yet return to his father. He sends Bardan and Chitradan back with presents and messages for his parents. After a voyage of three months Bardan and Chitradan arrive in their country and report to Dasarata and his queens.

(Lacuna in the text: Rama is informed that Sita is still alive and fetches her?) On his return to Langkapura with his wife and children Rama holds a council with Laksamana and Bibisana about the fate of Langkapura and the other kingdoms. Rama asks what should become of Ravana's children? Bibisana replies that he would not oppose Rama's orders, goes to the battlefield, turns to the East, and with the help of the Lord of the Universe brings back to life all those who have perished in the war, including Ravana's brother and sons. They pay obeisance to Rama, and Bibisana informs Indrajit, Gangga Mahaya Sura, Pētala Maharayan and Kumbakarna that by the order of Rama and Laksamana they are to return to their kingdoms, where their families and friends receive them with joy. Langkapura remains sovereign and becomes the mightiest of all realms.

Rama with Sita and his children and Laksamana sails to Mandurapura to visit his parents; Bibisana and Hanuman are to guard Langkapura during his absence. Dasarata is overjoyed to meet his sons again, from whom he had been separated for thirty years, one month and nine days. One festivity follows the other, but soon Rama asks to be allowed to return to Langkapura, as he does not trust those he has left behind. Dasarata agrees, and Rama sails back, calling on his way at another country (which? Ligur, of which he had become the king?), where he is received with honour. Returned to Langkapura, Rama entrusts the actual government to Laksamana and Bibisana, and peace, justice, welfare and happiness reign under Rama's sovereignty.

Anggada however mourns for his father Bali, whom Rama had killed. Anggada has done Rama great service, but Rama does not care for him any more since he has become a mighty ruler through Bali's death. He goes to Rama's palace and asks the doorkeeper: "Where is Maharaja Rama? I am Bali Raja and want to take revenge for Ravana." Rama, Laksamana and Bibisana are informed. Rama does not understand what has come over Anggada, but will try Anggada's strength and sends Laksamana to capture him. Anggada exclaims: "O greatest of gods, but

for the aid my father has given him, Maharaja Rama would have accomplished nothing, and yet he has no affection for me. O gods, now help me!" He hurries away and runs amok amongst Rama's subjects. Anila, Sempati, Kērangga Tula are unable to vanquish him; when the latter asks him what he wants, Anggada replies that Rama does not act rightly; does Kērangga Tula not understand? More he will not say. Rama asks Sugriva and Hanuman to capture Anggada; they reply: "We have not the courage to fight against Anggada, because he is in the right, and besides, he is our brother. If we are asked to help Anggada, we are willing." Bibisana says that as far as his knowledge goes, Anggada is invincible, as there is (the force of) an (unfulfilled) solemn promise (لُجُّ) in Anggada. Rama is surprised, but furious, takes his bow and arrows and shoots at Anggada, who grasps each arrow as it comes and derides Rama. Laksamana sends his sword against him, which Anggada seizes likewise. Janggapulawa, Rama's son, would take up the fight, but Bibisana prevents him: "Do not fight against Anggada; he is invincible just now, as somebody helps him." Anggada would attack Rama. Hanuman intervenes and tells him not to touch his (Hanuman's) father and their sovereign, a mighty king, (whom to touch) may bring disaster (*madsarat*) upon them. Anggada desists. Hanuman goes to Rama and tells him that his country will be destroyed unless Rama devises some means to get out of this dilemma. Laksamana and Bibisana, whom Rama consults, leave the decision to him. Rama says: "I will fight Anggada"; Hanuman is silent. Rama mounts his car, Laksamana his black horse, and they discharge their arrows on Anggada. The latter rushes against Rama. Laksamana throws himself between them, Anggada seizes him and throws him down violently several times until Laksamana seems dying. Rama jumps from his car and hastens to the spot. Hanuman intervenes, rescues Laksamana from Anggada and carries him to Rama, Anggada following. Hanuman advises Rama to have Bali Raja revived and to satisfy his wishes, as otherwise Anggada will destroy Langkapura. Rama sends Bibisana to Bali's grave and carries Laksamana into his palace.

Bibisana at Bali's grave prays to the gods, and crossing his arms concentrates his thoughts on Bali. Bali awakes, and asks Bibisana what has brought him hither. Bibisana replies that Rama has sent for him, and together, walking over the waters, they go to Rama. Hanuman brings Anggada and both in great joy throw themselves at Bali's feet. Rama says: "O brother Maharaja Bali, the kingdom of Ligur your servant returns to my Lord." Bali replies: "O Sēri Rama, the kingdom of Ligur you may give to Anggada, but if Sēri Rama shows disobedience against me, I shall order Anggada to substitute me as I have done now, as when Anggada ran amok it was not Anggada but me who went into him (*masok pada-nya*), because I saw that Raja Rama did not

care for him; that was the reason." Rama comprehends the greatness which the gods have bestowed upon Bali, and that none is equal to him. Bali disappears. Anggada is conducted to Ligur and assumes the reign of that country, following the custom established by his father. Langkapura and Ligur flourish and prosper in peace and happiness. Rama's son, Janggapulawa, returns to Maharishi Kala, visiting his father from time to time.¹ (p. 84-92).

¹ The story that Anggada challenges Rama to take revenge for the death of his father Valin (not for that of Ravana as above) occurs in the Hanuman-Nataka or Mahanataka, a drama in 9 acts said to be composed by Hanuman himself. (Mahanataka, a Drama in 9 Acts by Hanuman, compiled by Madhusudana Micra, edited by Jibanananda Vidyasagara, Calcutta 1878. English translation by Maharaja Kalikrishna Bahadur, Calcutta 1840). But in the Mahanataka Anggada's anger is calmed by a promise of the gods that in a later existence Valin as a hunter shall meet Rama (as Krishna) again and shall kill him. Otherwise our story does not follow the Mahanataka as far as I can judge from the contents of the latter given by Baumgarten (Das Ramayana, Freiburg i/Br., 1894, p. 127-129). The remarkable fact told in our story that Bali grants Rama's wish to conquer Ravana and regain Sita, that he remains immortal and controls and influences Rama's later actions, I have so far been unable to trace elsewhere. I do not think that this feature is the product of Malay imagination and presume that it goes back to some Indian (perhaps Siamese?) version of the Ramayana, which should point to a certain worship of Bali perhaps prior to the arrival of—or in reaction against—the Hinduism of the Sanskrit-Ramayana. Or has the monkey-king Bali become mixed up with the demon Bali, whom Vishnu in his fourth avatara as a dwarf robbed of his reign over the world? (Cp. Wilson, Hindu-Mythology).

OLD COFFINS IN BRITISH NORTH BORNEO CAVES.

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The Idahan, natives of Lahad Datu, who are said to be the descendants of Gomorid Kimau, the reputed discoverer of most of the caves in Madai, Baturong and Tapadong Hills, are a people whose ancestors were once the Dusuns of the place and four or five centuries ago "kafir." It is strange that many of the old men of Lahad Datu can trace their ancestors to six or seven generations back from Abdullah, traditionally the first of their ancestors to be converted to Islam. Legend says that before the natives accepted Islam, they placed their dead in coffins and kept them in caves where the coffins would withstand decay for a long time. There are caves in Madai, Baturong and Tapadong Hills where remains of coffins in excellent preservation can be found. It is interesting to note that the coffins are similar to those of Chinese make. Possibly the natives copied such coffins from the Chinese, who are reported to have been in North Borneo as early as the 12th century if not before.

The coffins which I have seen are mostly made of *Belian* and *Merbau*: some are made of softwoods belonging to the Diptero-carpaceae family. The tree was apparently cut into coffin-lengths, split into halves, hollowed out and carved to taste. Some of the coffins are beautifully carved. The lids of some are adorned with "*tembadau*" heads carved on both ends. The coffin is generally one to two inches thick and when empty can hardly be lifted by five men. Some of the coffins are very long, as long as nine feet. Inside the large coffins small coffins may be found. It is possible that these small coffins were loaded with jewellery and other property of the dead and put together with the corpse into the large coffin. On the floor of some caves containing coffins, I have dug and found numerous broken and rusty parangs, spears and knives, broken plates, broken jars, beads and various wooden articles.

The following are the names of the caves or places, in which old coffins can be found:

1. Pusu Samang Alag Cave—Madai Hill.
 2. Pusu Samang Tas Cave ,
 3. Kubonatok Cave ,
 4. Nagob Bilo (near it) Baturong Hill.
 5. Pusu Bakas (near entrance) ,
 6. Samang Buat Tapadong Hill.
 7. Samang Itay ,
 8. Mandag Awan ,
 9. Batu Blas Tambiroga Hill
near Tapadong Hill.

In Batu Blas Cave, the Dusun are said still to bury their dead in a similar manner to the old days. I have, however, not been able to visit this cave.

The above named caves and the places around the hills, as well as Kalang Balai Hill, which is south of Baturong Hill, and said to have once been a native village, may be of value in determining many facts about native life in the days before the advent of the Chartered Company.

MALAY NAMES OF MOLLUSCS.

By A. W. HAMILTON.

The following list of Malay names of local Molluscs was obtained during a residence in Singapore whilst the shells have been identified as far as possible in the Raffles Museum by comparison with named material or figures and descriptions. Whenever Dr. R. O. Winstedt has recorded the same name for the same species the letter "W" is placed after the Malay name.

angkek (rangkek W)	<i>Conus</i> sp.
bagit	<i>Tellina</i> spp.
bēlongkeng	<i>Ellobium auris-midae</i> (L.)
bērongan	<i>Telescopium</i> sp.
biji nangka	<i>Septifer bilocularis</i> L.
binga (bingar W)	<i>Melo indica</i> Gmel.
*bulan (W)	{ <i>Natica mamilla</i> L. <i>Natica intermedia</i> Phil.
butang	<i>Cypraea errores</i> L.
chamar	<i>Avicula macroptera</i> Lam.
changgai pētēri	<i>Cardium (Trachycardium) flavum</i> L.
chokoh	<i>Terebralia sulcatus</i> Born.
dara (darat W)	<i>Monodonta labio</i> L.
gebang	<i>Tridacna gigantea</i> L.
gewang	<i>Turbo marmoratus</i> L.
*gondang	<i>Dolium fasciatum</i> (Brug.)
gonggong (W)	<i>Strombus isabella</i> Lam.
gonggong jantan (W)	<i>Strombus urceus</i> L.
gurap	<i>Gastrarium tumidum</i> Bolten
halia	<i>Murex capucinus</i> Chemn.
ibau	<i>Lucina? philippinarum</i> Hanley
kapis (W)	<i>Chlamys radula</i> L.
kēlēntit pētēri	<i>Cardium (Hemicardium) cardissa</i> L.
*kēpah gading	<i>Meretrix meretrix</i> L.
kēpah merah	<i>Mactra</i> sp.
kērang bulu (W)	<i>Arca antiquata</i> L.
ketem	{ <i>Murex adustus</i> Lam. <i>t Murex capucinus</i> Chemn.
kijing (W)	{ <i>Tellina</i> spp. <i>Capsella solida</i> Rve.
kilah (W)	<i>Voluta scapha</i> Gmel.
kima (W)	<i>Tridacna squamosa</i> Lam.
kupang	<i>Modiola</i> spp.
lokan	<i>Glaucomya virens</i> (Hanley)
lolak (W)	<i>Mytilus smaragdinus</i> Chemn.
lupat (W)	<i>Cyrena zeylanica</i> Lam.
	<i>Trochus niloticus</i> L.
	<i>Hippopus hippopus</i> (L.)

mata lēmbu (W)	<i>Turbo ticaonicus</i> Rve.
mata merah	<i>Cerithidea obtusa</i> Lam.
onam	<i>Melongena pugilina</i> Born.
pial ayam	<i>Pinna vexillum</i> Born.
pinang	<i>Cassidula mustelina</i> (Desh.)
puting bēliang	<i>Pinna atropurpurea</i> Sow.
ranga (r. bētul W)	<i>Pteroceras lambis</i> (L.)
rēmis	<i>Donax faba</i> Chem.
sēlat batu	<i>Tridacna ferruginea</i> Rve.
sēmau	<i>Ostrea rivularis</i> Gould.
sēmonchong	<i>Anomalocardia squamosa</i> L.
sēnolit	<i>Arca (Barbatia)</i> spp.
sinting	<i>Placuna sella</i> Lam.
*songsong harus	<i>Murex martinianus</i> Rve.
sumbun	<i>Solen malaccensis</i> Duncker
susu	<i>Trochus (Infundibulops) radiatus</i> Gmel.
	<i>Trochus maculatus</i> Linn.
tapak kuda	<i>Navicella</i> sp.
tepeh	<i>Circe tumefacta</i> Sow.
tēritip bakau	<i>Ostrea nigromarginata</i> Sow.
tēritip karang	<i>Spondylus</i> sp.
togok	<i>Chama</i> sp.
ukas bētina	<i>Pinctada vulgaris</i> (Schum.)
ukas jantan (ukas W)	<i>Ostrea</i> sp. <i>Malleus vulgaris</i> Lam.

*Note.—Dr. R. O. Winstedt gives the same name to another species.

SOME MALAY WORDS.

By A. W. HAMILTON.

<i>Bagok</i>	a common proper name for a <i>bērok</i> , the pig-tailed macaque, as Reynard is for a fox in England—also Pa' Bagok and Pa' Sibagok.
<i>Lēmusir</i> (Ked)	saddle—as in a saddle of mutton: the delicate meat on either side of the back bone.
<i>Pochai</i> (Joh)	a broad flat shallow barge with square ends used as ferry boat for goods traffic (probably a Chinese word).
<i>Chukian</i> (Joh)	(Chinese <i>Chhū kiān</i>) a hut.
<i>Banta</i> (Joh)	a firewood-cutter's encampment or cabin.
<i>Panglong</i> (Joh)	Chinese <i>pan long</i> a wood-cutter's encampment usually applied only to a Chinese wood-cutting <i>kongsi</i> .
<i>Ongke</i> (or <i>hongke</i>) (Joh)	The head of all the <i>kangchus</i> , who resided in Johore, and through whom all trade was conducted (Chinese <i>ong ke?</i>). The headman of a <i>kangka</i> , who possessed certain powers and privileges and was also the local gambling farmer (Chinese <i>kang chū</i>).
<i>Kangchu</i> (Joh)	thin gelatinous filaments made from rice flour cooked in a watery soup (Chinese).
<i>So'un</i>	a supervisor.
<i>Pēnyēlia</i> (Joh)	a frequentative of <i>saudara</i> .
<i>Saudara mara</i>	Hindustani <i>khargosh</i> a rabbit.
<i>Argus</i> (Pen) (or <i>arkus</i>)	a firearm is probably derived from the Tamil <i>vedil</i> the explosion of gunpowder.
<i>Bēdil</i>	a horse. Malayalam is <i>Kudira</i> and Tamil (Poona) <i>Kudirei</i> .
<i>Kuda</i>	

SOME KELANTAN PLACE NAMES.

By REGINALD J. BEE, A.C.G.I., A.M.INST. C.E., F.R.G.S., M.C.E.S.

The interpretation of most Malay place names is by no means an easy matter having regard to the many waves of religious thought grafted on to the original pagan religion, combined with the numerous corruptions and idioms in speech that obtain in different parts of the country. The following names are examples of the facile way the Malay records his impressions, usually in a poetic and sympathetic manner.

TABAL. A small village on the East coast of Siam near the Kelantan border. Derived from Tak Bai the Patani dialect for "The place of drying sails."

TEMANGAN. A small village in Kelantan. This name comes from "Timbangan" due to the likeness of two near-by hills to the pans of a primitive weighing scale.

RANTAU PANJANG. Named from a long line of houses built during the construction of the railway.

TUMPAT, the port of Kelantan. This is not named from the word meaning a place filled up with earth, but from the local name for a special type of cakes which were and are still made and sold there.

MANEK URAI. The name of this village is taken from a small rapid in the Sungai Lebir, upon the banks of which it stands. Legend tells of a famous Pawang of the Ulu who, in the days of old, held many "Dances of the Fairies" in this neighbourhood. On one occasion his woman "Petri" worked herself up to furious activity during the course of the invocation so that a string of beads were jerked from her neck and flung far out into the river. So great was the power of the genie then within her that the broken beads formed a small rapid of dancing water, which has remained to this day.

KUALA KRAL the centre of the Administration of the Ulu was called Mengkubang of old. This name comes from a large rock below the present D.O.'s house, said to be the grave of a powerful Pawang.

TEMIANG. The Sungai Temiang is said to be named by the Pangan tribe of this area who tell of dense impenetrable thickets in the Ulu of this stream.

KEMUBU. This village is named after the common fish trap and means "The place of many fish traps."

GUNONG SITONG. This peak dominating the main Kelantan river by Pergau and Kemuba has a very peculiar nose-shaped summit whence came its real name, Gunong Restong. Gunong Ayam is a neighbouring peak and is definitely not the one mentioned above, although it is sometimes so identified.

A MALAY GARDEN.

By A. W HAMILTON with Botanical Determinations
by R. E. HOLTTUM.

Balong Ayam (P), **Pial Ayam** (S). *Celosia cristata* Linn.,
Amarantaceae; cock's comb.

Chéraka (K). *Plumbago rosea*, Plumbaginaceae; the pink
Plumbago, commonly cultivated as an ornamental shrub.

Bakawali (K). *Epiphyllum oxypetalum*, Cactaceae; a night-
flowering Cactus with large white fragrant flowers borne on a
flattened leaf-like stem. Sometimes called *Kengwa* from *Keng Hoa*
(Chinese). This is a Brazilian plant. The name is probably
taken from the romance entitled *Gul Bakawali*.

Ekor Kuching. *Acalypha Sanderi*, Euphorbiaceae; a shrub
with long red catkin-like inflorescences, originating from New
Guinea.

Bogak. *Cycas* spp. Palm-like plants with stiff leaves. The
male plants bear large erect cones; the female bear seeds attached
to leaf-like organs. The commonest Malayan species is *C. Rumphii*.
C. siamensis occurs on the limestone in the north and *C. revoluta*
(smaller) is also cultivated.

Hinai. *Lawsonia alba*, Lythraceae. Hennas. A small leaved
shrub with fragrant flowers. The dye is made from the crushed
leaves.

Chēmpa (P), **Chēmpaka** (S). *Michelia champaca*, Magno-
liaceae. The champak tree, well-known for its fragrant flowers.
The yellow and white varieties are distinguished by the addition
of the words *Kuning* and *Puteh*.

Jadam. *Agave*, and *Aloe*. Aloes are African in origin, and
Agaves American; the former are on the whole smaller plants with
more succulent leaves, but both have a similar rosette habit.
Species of both are sometimes cultivated ornamentally. Several
of the Agaves provide a valuable fibre.

Puding. *Codiaeum variegatum*, Euphorbiaceae. The croton.

Bunga Kubor (S), **Kēmoja** (S), **Chēmpaka** (P), *Plumeria*,
Apocynaceae. The Franjipanni, often planted in cemeteries. In
Penang the large white flowered species is called *Chēmpaka puteh*,
and *P. rubra* is *Chēmpaka merah*.

Kēlang (K) or **Tēlang**. *Clitoria ternatea*, Papilionaceae.
Climber of the pea family with blue flowers. The flowers yield
a blue dye which can be used for colouring sweetmeats.

Daun Ati-atí. *Coleus*, Labiate. Variegated red and yellow
leaved herbaceous plants commonly cultivated.

Jérémín (S), **Lima jari** (P). *Pelargonium* sp., Geraniaceae. The scented geranium. The southern name is derived from the word geranium, and the northern from the finger-like form of the leaves. This is a favourite leaf with Malay women for wearing in the hair. The plant is said to wither and die if touched by a woman during her menses.

Sundal malam. *Polianthes tuberosa*. The tuberose. The Malay name refers to its captivating scent at night.

Mata hari. *Helianthus* spp., Compositae. A general name for sunflowers.

Mati laki mati bini. *Hibiscus mutabilis*, Malvaceae. The rose of sharon. Also known as *laki pukul bini*; both Malay names are due to the flowers changing colour from white to red as they fade.

Télukis (S), **Goyap** (P). *Dianthus sinensis*, Caryophyllaceae. The commonly cultivated pink. The Penang name is from the Chinese *gō kidp*; *télukis* refers to the painted effect of the flowers.

Kértas. *Bougainvillea* spp., Nyctaginaceae. *Zinnia*, Compositae. The name in both cases is derived from the paper-like consistency of the petals.

Mélor. *Jasminum sambac*, Oleaceae. The commonly cultivated Indian jasmine, often with double flowers.

Rompok (P), **Mélor jawa** (S). *Clerodendron fragrans*, Verbenaceae. An untidy shrub with masses of fragrant double flowers, commonly cultivated.

Mélor susun (P), **Mélor Bétawi** (S). *Jasminum*, Oleaceae.

Jalang (P). *Vinca rosea*, Apocynaceae. The rose and white periwinkles, commonly cultivated for their flowers. The Malay name is owing to their running wild in the Kampongs.

Jambul mérak. *Caesalpinia pulcherrima*, Leguminosae. Shrub with orange flowers, known as Peacock's plume and sometimes as gold mohur.

Péchah émpat (S), **Séroja** (P). *Mirabilis jalapa*, Nyctaginaceae. A herbaceous plant with crimson flowers opening in the afternoon, often called Four-O'clock.

Tanglong. *Hibiscus schizopetalus*, Malvaceae. The Hibiscus with pendulous flowers and much-lobed petals. The name is due to a fanciful resemblance to a Chinese lantern.

Raya. *Hibiscus rosa sinensis*, Malvaceae. The common Hibiscus.

Bunga China. *Gardenia florida*, Rubiaceae. The commonly cultivated Gardenia with heavily scented flowers. It is a native of China.

Késidangan (M), **Kérak nasi** (K). *Vallaris pergularia*, Apocynaceae. Climber; leaves opposite, thin, elliptic, about 4 x 2½ inches. Flowers white, axillary, about ½ inch across. The plant contains a white latex. Native of India and Burma. The flowers are worn in the hair by Chinese and Malay women.

Sémangkok, Daun belangkas (K). *Panax conchifolium*, Araliaceae. Shrub with roundish leaves, more or less bulging so as to form a shallow cup shape, both names are derived from the shape of the leaves.

Sénjuang, Jénjuang (K). *Dracaena* sp., Liliaceae. One of the Dracaenas, cultivated in gardens for their foliage.

Susun kélapa. *Ervatamia coronaria*, Apocynaceae. Shrub with opposite shining leaves and white flowers (often double) somewhat resembling a Gardenia; contains a white latex. Native of India.

Bunga tanjong, Kékula (K). *Mimusops elengi*, Sapotaceae. A small bushy tree of the same family as the gutta percha and chiku. The flowers are small and fragrant, and are often collected by children and threaded on strings to be worn in the hair.

Bunga kimbong, Hinai pachak (K), **Hinai ayam** (M). *Impatiens* spp. (Balsam), Balsaminaceae. Names applied to cultivated balsams. The name *Hinai* (henna) is used because a dye resembling henna can be extracted from the leaves. *Kimbong* is derived from the Chinese *Kim Hōng*.

Bunga bonet (P), **Bunga bérteh** (K). *Antigonon leptopus*, Polygonaceae. The so-called "Honolulu creeper," native of tropical America. The Kedah name is due to the resemblance of the flowers to popped rice.

Kenyong (M), **Ubi géréda** (K). *Canna edulis*, Cannaceae. The edible Canna, with small red flowers.

Pisang tasbeh. *Canna*. Cultivated ornamental varieties of Canna. Rosaries can be made from the seeds and the leaves have a faint resemblance to banana (*pisang*) leaves.

Bunga jéjarum, Nyényarum (P), **Péchah piring** (S), **Péchah périok** (M), **Santan** or **Siantan** (M). *Ixora*, various species. Rubiaceae. The appellations are due to the appearance of the flowers.

Télor bélangkas. *Aglaia odorata*, Meliaceae. Small tree with small spherical fragrant yellow flowers. The Malay name is due to the resemblance of the flowers to the edible eggs of the king crab.

Tabut (P). *Clerodendron paniculatum*, Verbenaceae. Shrub with an erect pyramidal inflorescence of small red flowers, the Malay name referring to the resemblance of the inflorescence to a processional float.

Kēnanga. *Cananga odorata*, Anonaceae. Tree with fragrant flowers; the perfume *ilang-ilang* is distilled from them. The yellow green petals are a favourite with Malay women for scenting the hair or the bed.

Kēsumba. *Bixa orellana*, Bixaceae. Anatto. A tall shrub with white flowers and spiny dehiscent fruits. The seed-coats yield a red dye. Native of tropical America.

Kuku gērēda (P). *Panax*, Araliaceae. The commonly cultivated Panax with much divided leaves. The Malay name is due to a fancied resemblance of the leaf divisions to the Garuda's claws.

Kēmuning. *Murraya exotica*, Rutaceae. A small tree with fragrant flowers; from the wood are made the finest *Kēris* handles.

Daun Kēpah (S). *Rhoeo discolor*, Commelinaceae. A small plant with a rosette of fleshy leaves, purple beneath; the white flowers are borne in groups between pairs of large bracts below the leaves; the Malay name refers to the resemblance of the floral bracts to a clam shell.

Tēlor Dewa (K), **Gēndola** (M). *Passiflora quadrangularis*, Passifloraceae. The Grenadilla. The unripe fruit is eaten by Malays as a vegetable. The Kedah appellation is owing to the size of the fruit, whilst *gēndola* may be derived from grenadilla.

Anggērek, an orchid. This name is applied to all epiphytic orchids.

Paku, a general name for ferns.

Sēlaseh dandi (S), **Kērēmak**. *Alternanthera*. Amarantaceae. The small reddish-leaved herbaceous plant often used as an edging for flower beds.

Tēmbaga suasa (S), **Mēlong** (P). *Crinum asiaticum*, Amaryllidaceae. The large species with a large inflorescence of flowers with narrow petals, usually found wild near the sea, and also cultivated. The southern name is no doubt due to the gold brown colouring of the inside of the flowers.

Ulam Raja, Pēlampong (S). *Cosmos caudatus*, Compositae. The species with rose coloured flowers, the leaves of which are eaten in salad form by Malays.

Butang (S), **Tiga bulan** (P). *Gomphrena globosa*, Amaranthaceae. The globe Amaranth or bachelor's button. The Singapore name is probably derived from the English, and the Penang name refers to the lasting quality of the flowers.

Tai ayam. *Tagetes* spp., Compositae. A general name for the African marigold and allied plants, owing to their unpleasant odour.

Tai ayam munai. *Lantana aculeata*, Verbenaceae. Common shrub with groups of orange flowers (there is also a pink kind). The Malay name is owing to its unpleasant odour and the fact that it bears a wet and slimy berry (*munai*) which when ripe is eaten by children.

Bunga Pisang. *Talauma mutabilis*, Magnoliaceae. A bushy shrub with egg shaped white flowers, half an inch long. They are exceptionally strongly scented (like a banana according to Malay notions) and are placed occasionally under pillow on a bed.

Bunga Têlor. *Talauma Candollei*. A tall shrub with creamy yellow fragrant flowers, egg-shape (hence its name) never fully opening.

Kekwa. *Chrysanthemum*, Compositae. From the Chinese *Kek Hoa*.

Tongkeng. *Pergularia minor*, Asclepiadaceae. The Tonkin creeper, which bears hanging bunches of very fragrant greenish flowers.

Many flowers of comparatively recent introduction are called by their English names such as *Bunga Dalia* (Dahlia) and *Bunga Ros* (Rose) even though the latter has a poetic equivalent in *Bunga Ayer mawar*.

(K) = Kedah. (S) = Singapore. (P) = Penang.
(M) = Malacca.

SOURCE OF THE MALACCA, JOHORE AND PAHANG GENEALOGIES IN THE BUSTAN-AL-SALATIN.

By W. LINEHAN.

While I was stationed in Pekan 1923-1926, Tengku Sulaiman, the Tengku Besar of Pahang, lent me a manuscript of the *Bustan-al-Salatin*. This I believe to be the copy to which the late Mr. Barnes when Resident of Pahang had access and which is the subject of Dr. Winstedt's paper on "The Genealogy of Malacca's Kings from a copy of the *Bustanu's-Salatin*" (Journal S.B.R.A.S. 1920). This copy described as the "Pahang M.S." is referred to in the final paragraph of Mr. Wilkinson's paper, in the last issue of this Journal, on "The Early Sultans of Pahang." The Tengku Besar allowed me to take a copy of his manuscript and the following is an extract from it:-

"Fasal yang ke-dua-blas pada menyatakan tarikh segala raja-raja yang kerajaan di-Negeri Melaka dan Pahang:-

Kata Bendahara Paduka Raja yang mengarang Kitab Masirat *Sulalat a's-Salatina* ia menengar dari-pada bapanya ia menengar dari-pada nenek-nya dan datok-nya pada hijrat al-Nabi *salla Allahu alaihi wa's-salam sa-ribu dua-puloh esa* pada bulan Rabi-al-awal pada hari Ahad ia mengarang hikayat pada menyatakan peraturan segala raja-raja yang kerajaan di-Negeri Melaka, Johor dan Pahang dan menyatakan bangsa dan salasilah mereka itu dari-pada Sultan Iskandar Zul-Karnain. Kata ahli-ul-tarikh. Bahawa Iskandar Zul-Karnain....."

Then follows the genealogy of Raja Iskandar down to the Malacca, Pahang and Johore Sultans.

In reply to a query by Dr. R. O. Winstedt, the Professor of Malay at Leiden, Dr. Ph. van Ronkel, has been good enough to look up the passage in the old folio MS. of Leiden University Library and reports that there too the passage is identical with the above, except that after *datok-nya* the word *tatkala* is inserted, the words *salla Allahu alaihi wa's-salama* are omitted and *pertuturan* is accidentally written for *peraturan*. Professor van Ronkel adds that the two MSS. in the Library of the Royal Asiatic Society are identical but both read *peraturan*.

Though he is not mentioned by name, the Bendahara Paduka Raja is of course Tun Sri Lanang, the author of the *Sejarah Melayu (Sulalatu's-Salatina)* written about 1612 A.D. And the above extract affords a strong indication that the account of the Peninsular Sultans given in the *Bustan* is largely derived from the *Sejarah Melayu*.

REVIEW.

A Malay-English Dictionary by R. J. Wilkinson, C.M.G., 2 Parts, Mitylene, Greece, 1932.

It is thirty years since I first met the lexicographer at Kuala Kangsar, accompanied by a Malay "word-catcher" that literally "lived on syllables." The first part of the first edition of this Dictionary had even then appeared, and the second part was in the press. But until he left Malaya in 1915 Mr. Wilkinson always had an interleaved copy of his dictionary beside him and was constantly adding to its words. He was good enough to lend it to me when I was compiling my *English-Malay Dictionary*. After retirement he returned again to his first love, and in spite of the sack of Smyrna and the loss of part of his material and absence from the Malayan scene, Mr. Wilkinson has here given us a final edition of the work he started some forty years ago. It is the best Malay-English Dictionary in any language, nor perhaps is it likely to be superseded by any European lexicographer, English or Dutch. Some day, it may be, the Malay College at Tanjong Malim may form a Committee of Malays from every State of the Peninsula to compile a great Malay Lexicon. Yet in Dryden's phrase, after Mr. Wilkinson's "bees, their latter swarm" may be "scarcely worth the hiving" except for dialect words. Some day, there may be produced an etymological dictionary based on comparative study of the family of languages to which Malay belongs. Even then Mr. Wilkinson's work will still have its practical value, for the merchant, the government servant and the scholar.

There is one inaccuracy on p. 99. A child's bib-like garment, reaching from its neck to its belly, is *barut*: *bedong* is the long wrapper in which a baby is swaddled from head to heel.

In a postscript Mr. Wilkinson promises an appendix of more botanical and medical terms. Dr. Gimlette is wrong in differentiating between *demam gigil*, *d. ketar*, and *d. kura*: all three mean *coldague due to malaria*. I doubt too, his differentiation between *demam kepala* and *d. pialu*. *Demam tiada bertika* untimely fever: the last word must be a Kelantan abbreviation for *berketika*.

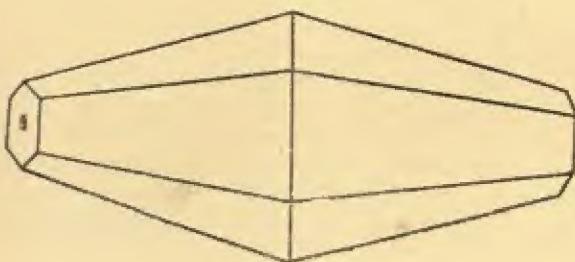
The format of the dictionary is handsome and its price low. Mr. Wilkinson will earn the gratitude of Malay scholars of all races for a *magnun opus* that must be their constant companion. Such a book alone would suffice as a man's life-work, but not only has Mr. Wilkinson been a lexicographer: he also edited the well-known series of *Papers on Malay Subjects* and wrote a number of them. Finally he has been a distinguished administrator.

R. O. WINSTEDT.

AN ANCIENT CORNELIAN BEAD FROM PAHANG.

By IVOR H. N. EVANS.

A remarkable cornelian bead of large size was recently sent for examination and description by Mr. R. M. A. Maycock of Jerantut Estate, Pahang. It is illustrated in the annexed natural-sized sketch. The bead is 7.1 cms. long and its greatest breadth is 3.6 cms. It is a long, hexagonal-section, spindle bead, truncated at the ends and of veined and striped cornelian. It was discovered by Mr. Maycock near the top of a cleared and planted hill and, when first found, was imbedded in the soil of a rather steep slope and showed only one facet. Mr. Maycock remarks that its position was rather out of what he would imagine to be a normal track and he thinks that originally it must have been buried about one foot nine inches below the surface.



Ancient cornelian beads are known from Malaya and extend, at any rate, from our Iron Age into the 13th and 14th Centuries A.D. The only specimens yet definitely ascribed to our Iron Age are three spherical specimens from a grave constructed of granite slabs, found many years ago at Changkat Manteri, near the Bernam River, Perak,¹ but many hundreds of cornelian beads of various types have been secured from the ancient village site near Kuala Selinsing, Perak, which is of a much later date. The finds at this place have been described in various papers in the *Journal of the F.M.S. Museums* and a full account has already appeared in the same *Journal*, Vol. XV, part 3. A hexagonal-section spindle bead, such as that from Jerantut Estate, seems, however, to be unknown in the Malay Peninsula hitherto. We have many faceted spindle beads from Kuala Selinsing, but these have a rectangular section.

It is difficult to say anything certain as to the age of the specimen now described. Possibly it may have been washed out

¹ *Journ. F.M.S. Mus.*, Vol. XV, 1928, pp. 111-119 and Pls. XXXIII-XLIII.

of a grave, and it is known that Iron Age graves were sometimes on the slopes, or tops, of hills. On the other hand, we have yet no proof that faceted stone beads were known in the Malay Peninsula during our Iron Age and the only three specimens referable to that period are spherical, which is generally considered to be an earlier-evolved type than the faceted bead.

I have noted elsewhere that long beads from Kuala Selinsing are bored from either end (a method, I believe, still used in India) and that the bores often meet one another at an angle, or, in a few beads, do not meet at all, so that the bead cannot be threaded. The present bead is too thick for the method of boring to be determined by viewing lengthways against a bright light and the only means that one has of judging how boring was done is by looking through the hole from one end. This is not very satisfactory, but I believe that this bead, too, has been bored from both ends. The bore appears to be fairly correct, but has a rifled appearance perhaps due to the occasional shifting of direction of the boring tool.

The stone of which the bead is made is of foreign origin; for cornelian is not found in the Malay Peninsula. I suspect that it came from India, but some bluish-white markings on it are rather like those that I have seen on cornelians that were said to have been derived from Arabia. The trade in beads made from semi-precious stones was widespread at an early date.

THE SRI LANANG PEDIGREE.

By R. J. WILKINSON, C.M.G.

In the first paragraph of an interesting history of "the Bendaharas and Temenggongs" (Vol. X, part i of this Journal) Dr. Winstedt refers to the genealogy of the Bendaharas given by me in my Malay History (Third Edition, pp. 65, 66, Singapore, 1923) and then goes on to say.

"But Tun Sri Lanang summarizes his ancestry in words on which the light of scholarship has only recently been thrown: *Tun Muhammad nama-nya, Tun Séri Lanang timang-timangan-nya, Paduka Raja gëlaran-nya, Béndahara, anak orang kaya Paduka Raja, chuchu Béndahara Séri Maharaja, chichit Béndahara Tun Narawangsa, piut Béndahara Séri Maharaja, anak Séri Nara Diraja Tun Ali, anak baginda Mani Purindan, kaddasa Allahu sirrahum, Mélalu bangsa-nya, dari Bukit Si-guntang Mahamiru, [Malakat négeri-nya Batu Sawar daru 's-sallama].*"

Dr. Winstedt omits the bracketed words that close the paragraph. They are important.

Did Tun Sri Lanang himself ever write the passage in question? There are four good reasons for doubting this.

(i) The passage is omitted from Dr. Blagden's variant version of the *Malay Annals* referred to in Dr. Winstedt's footnote to his article (p. 56). This fact alone would suggest that the lines in question were inserted at a later date than the original text.

(ii) Malays rarely claim the authorship of their own books and, when they claim it, they always refer to themselves in very humble terms. Sri Lanang calls himself a "poor wretch" (*Jakir*) and a "double-dyed ignoramus" (*jahil murakab*),—and then is represented as bursting out into a vainglorious passage giving all his honours and titles and his ancestry for many generations. Among Malays such things are not done. The praise can only have been interpolated by others after Sri Lanang was dead.

(iii) The passage was misunderstood by Dr. Rouffaer who has misled Dr. Winstedt. The closing words do not refer to *Baginda Mani Purindan*, as they say, but to Tun Sri Lanang. Mani Purindan was not a mystic, nor a Malay, nor a man of Malacca family, nor a resident of Batu Sawar. Tun Sri Lanang was all four. And the blessing invoked on his name (*kuddasa Allahu sirrahum*) implies that he was dead.

(iv) The genealogy is incorrect. Tun Sri Lanang was not descended from the Bendahara Sri Maharaja Tun Mutahir but from his brother, Tun Tahir, Sri Nara Diraja. The Bendahara

Tun Narawangsa is mentioned in two places as a son of Nara Diraja. Tun Sri Lanang was meticulously accurate in his genealogies and would not have made an error of this sort.

Incidentally the story of *Baginda Mani Purindan* will not hold water. This man is said to have come to Malacca in the reign of Muhammad Shah (A.D. 1424–1444), and there to have married the daughter of a Dato' Sri Nara Diraja. Yet in 1445 A.D. he is said to have had a grown-up grandson (Raja Kasim) by this marriage, as well as a very aged son (Tun Ali) who, a few years later, was laughed at for marrying a young wife. Nor is Dr. Rouffaer happy in the suggestion that this *baginda* was a Minangkabau Malay. Tun Ali, his son, was described by the captive Pahang prince (Maharaja Dewa Sura) as "this old Tamil" (*Kēling tua ini*); and that is precisely what he was. He was an Indian merchant who engineered a coup d'état in Malacca and was ennobled (as Sri Nara Diraja) by the young prince, Raja Kasim, whom he put on the throne under the title of Muzaffar Shah.

The list of *bēndahara* given on p. 66 of my History (3rd Edition) needs supplementing with three more names. "The old Kling," Nara Diraja, was himself a holder of that office for a time and should figure as the fourth Bendahara. Tun Isup Berakah, son of Tun Khoja Ahmad the ninth Bendahara, succeeded his father in the post and was the tenth Bendahara (Paduka Tuan). This comes out in Blagden's variant version (JRASMB., 189). Tun Mahmud, Tun Narawangsa, was the twelfth Bendahara; this is shown in the Tun Sri Lanang genealogy and is supported by the Malay Annals (usual version) and by Blagden's variant account which gives us his career as *tēmēnggong* and his appointment as *pēnghulu bēndahari*. Tun Sri Lanang was therefore the fourteenth Bendahara and not the eleventh.

Another fact not brought out in the genealogy is that there were two *bēndahara* houses, one Malay and one Indian. These were rivals at first; but became so connected by intermarriage that the rivalry may have disappeared or the Malay house may have died out.

I. The Malay House.*Tun Pérpateh Périska Berjajar*

Tun Pérpateh Bésar
B. Sriwa Raja (I).

Raden Anum
B. Sri Amar Diraja (II).

Tun Pérpateh Sédang
B. Sriwa Raja (III).

Tun Perak of Klang
B. Paduka Raja (V).

Tun Pérpateh Puteh
B. Puteh (VI).

Tun Pikrama
B. Paduka Tuan (VIII).

Tun Khoja Ahmad
B. Paduka Raja (IX).

Tun Isup Béragah
B. Paduka Tuan (X).

Tun Biasid
B. Sri Maharaja (XI).

II. The Indian House.
Baginda Mani Purindan.

Tun Ali
B. Nara Diraja (IV).

Tun Tahir
Sri Nara Diraja.

Tun Mutahir
B. Sri Maharaja (VII).

Tun Mahmud
B. Tun Narawangsa (XII).

Tun Isup Misai
B. Sri Maharaja (XIII).

Tun Ahmad
Temenggong Paduka Raja.

Tun Sri Lanang
B. Paduka Raja (XIV).

Tun Anum
B. Sri Maharaja (XV).

Tun Jenal
B. Paduka Raja (XVI).

PULAI: AN EARLY CHINESE SETTLEMENT IN KELANTAN.

By S. M. MIDDLEBROOK, M.C.S.

General.

Pulai is situated about 9 miles from Gua Musang and is reached by jungle path. The ground rises gently and the walk is not difficult. The path is well looked after by the Pulai Chinese themselves and the numerous jungle streams are easily crossed by flat planks. The road was easier than usual at the time of my visit because the birthday feast of the Goddess of Mercy had been held shortly before and the path had been cleared of bamboos and over-hanging growths to allow an easy passage of the sedanborne gifts for the Goddess.

Approaching the village the ground is clearer and there are fields of paddy land with occasional pigs and water buffaloes wandering about. At intervals there are groups of small buildings made of paddy clay and bamboo. Each has a buffalo shed near, and consists of a small central hall with a beaten earth floor, with the bedrooms opening behind. At the sides are the kitchens. The roofs are thatched. Over the lintel and down the sides of the door are vivid lucky strips of red papers with gold and black lettering. A paper God of War—Kwan Kung—is frequently displayed inside the houses.

The valley itself is beautifully shaped. It is wide, with extensive paddy lands, marked out in small squares by ridges of earth on which small bushes grow. The appearance is very similar to England although the fields of paddy are in tiers.

Down the centre of the valley flows the river which is quite wide with thick shrubs at the edges. The sides of the valley are steep and are thickly covered with jungle: they gradually curve inwards so that the effect is that of a deep green cup although the sides are not so high as to be oppressive. On the high ground near the village there is a magnificent view of the surrounding range of mountains, and in the valley itself are several wooded jagged outcrops of limestone.

Historical.

On page 44 of "Kelantan: A State of the Malay Peninsula" by W. A. Graham, published in 1908 there is the following reference to Pulai:

'The Temangong, brother of Rajah Mahmat, the Sultan, was murdered by the Chinese gold miners at Pulai. This was done at the instance of the Temangong's brother, Raja Banggor Benda-hara. The young son of the Temangong, Raja Snik, took the matter up and exterminated the Chinese at Pulai.'

This incident must have happened shortly after 1800.

In the same book, pages 102-104, the following account of this massacre is given:—

'Gold has been mined in Kelantan from a very remote period, a fact which is attested by the presence of traces of old workings in many parts of the State, the history of which has been entirely lost. Apparently the industry has always been entirely in the hands of Chinese, who must have settled in the gold-producing districts in considerable numbers, and a few of whose descendants persist to this day, at Pulai and elsewhere. During ancient days, when there was no Raja in Kelantan of any far-reaching power, the Pulai settlement grew into a rich and powerful community regarding with very scant respect the orders of the Malays sent by the Rajas to make demands for royalties on the gold resulting from their mining, and frequently sending such messengers back to the capital with scant politeness. At length, however, during the time of Raja Mahmat they fell upon evil days. A monopoly for the sale of rice having been given by the Raja to his son the Temanggong, the latter proceeded to Pulai to enforce his rights there. The Chinese miners who lived entirely on rice which was brought up the river from the plains, refused to comply with the extortionate demands of the monopolist. The traffic of rice-boats on the river was stopped, famine supervened, and the starving miners, excited and exhorted thereto by a brother of the Temanggong, attacked and killed the princeling monopolist. Thereupon with all haste an expedition was organised from Kota Bahru by the son of the murdered Temanggong, who ascended the river, overcame the Chinese, and put the whole community to the sword. The river ran red with blood, decaying corpses polluted the air for miles, the gold amassed by years of labour became the spoil of the avengers, and the gold-mining industry of Kelantan came to a sudden end. Gradually, however, in after years, the village of Pulai grew again, a few survivors of the massacre being induced to return and to undertake gold-washing in the river.'

It is impossible to obtain any information concerning the origins of this settlement. One story is that over 200 years ago a Hakka chief named Chong Poh Chai (莊寶仔) who was a notorious robber in South China and lived on the island of Hong Kong, was wanted by officials of the Ching dynasty. He therefore fled with his followers to the East Coast of Malaya and eventually after following the river arrived at Pulai. There were no Chinese women amongst the original settlers. This story is very uncertain. Old mining prospectors say that there are huge areas of worked out gold bearing land on the borders of Pahang and Kelantan. The areas are so extensive that it must have taken centuries to work them. It is almost certain that all the land in and around Pulai has been worked for gold. It is probable that the original arrivals were looking for gold and drifted in either from China via Kota Bahru or from Perak. I tried to get some definite information

from the Capitan China but he was very vague about anything historical, but he did say that his own grandfather worked for gold and it was not until just before his father was born that the village started planting paddy extensively. There has been no extensive gold working for about 50 years although I found many evidences of minor fossicking a few miles above the village.

The Capitan was only able to give me slight details of two 'wars' with their neighbours. He understands that about 200 years ago over 100 Kochow and Kwangsi Chinese surnamed Phang came from Pahang and kidnapped several of the Pulai womenfolk. The village people resisted and fighting lasted for ten days and the Pahang Chinese were driven away. The other story is that about 35 years ago certain Sakai who lived in the neighbourhood for three years kidnapped three Pulai women. Again the Chinese fought and two were killed but after the Sakai had been driven away the three women returned.

Appearance, Language, and Population.

In appearance they look more or less like any other Chinese excepting that they are rather swarthy. They seem friendly, cheerful and healthy. I saw two who looked exactly like Sakais—short, thick-set with squat noses. The men wore either cotton shorts and vest or a strip of the usual red Chinese cloth wrapped around their middle. The women were dressed in the Siamese fashion with an ordinary sarong and a short additional sarong wrapped over the chest leaving the shoulders bare. Their hair was done in the Chinese way on top of the head with the usual pins. Two women were dressed in normal Chinese clothes with black trousers but these were recent arrivals from China.

The original settlers inter-married with Sakai women and Siamese, and it was not until comparatively recently that any women came to Pulai direct from China. Two years ago the druggist, who came from China himself sixty years before, arranged with a passage broker to bring him two daughters-in-law from China. The druggist's wife is also said to have come from China about thirty years ago, but these are the only instances. The Capitan said that his own grandmother was Siamese. There is at present only one man living with a Sakai woman and he came from China six years ago.

The population numbers between seven and eight hundred persons. The Capitan could not say how many women and children were under his control.

Hakka is universally spoken. According to the Capitan there have been a few cases of Kochow and Kwangsi jelutong tappers coming to live in the village. After settling down they married Pulai women and their children spoke only Hakka. The dialects spoken are Kayingchow and Tapu and the tone is quite pure.

Most of the population live outside the village in their own houses. The village itself is small and compact. Originally it must have been square shaped. Now three of the sides have been extended. The original houses and the Goddess of Mercy temple are made of paddy clay and bamboo. The walls are a foot thick and some of them are over 80 years old. The narrow streets are paved with flat stones and there is a small open space in front of the temple. The new houses are made of attap and bamboo and are not so substantial. Only about 100 people live in the village in which there are about twenty houses. There are one or two small grocery shops, and also a druggist. Hawkers come from Gua Musang to the village but stores are usually got by the villagers themselves.

Pulai is no longer isolated since the railway construction work began at Gua Musang. Previously goods had to be brought by river from Kuala Krai. The present Capitan used to go by boat with his mother to buy stores to sell in the village. It was in this way that he learnt Malay. Gradually more and more of them are learning a little Malay but even now very few of them can speak any.

Paddy is the principal stand-by; but the people are very poor. The Capitan himself has business interest in Gua Musang but the others, with the exception of the druggist, are farmers. They may still fossick for gold but not to any great extent. Very little money is used and that chiefly small change. When any public funeral subscription has to be made, contributions are made in paddy which is sold and the expenses paid with the proceeds. There is a small burial ground and most of the houses have one or two coffins ready for use. They are usually kept in a shed outside the house.

In the old days when they worked gold some of them returned to China to live, but probably very few. With rare exceptions those now living in Pulai have never been to China and are quite ignorant as to which is their ancestral village.

There seem to be no difficulties about marriage. It is arranged in the usual way, by go-between, and marriage documents are prepared. There seems to have been frequent intermarriage between the families and there is little doubt that the whole community is particularly immoral. Divorce is very easy and the women seem to drift from husband to husband.

They keep the principal Chinese Festivals; the 5th of V Moon (Dragon Boat), 19th II Moon (Goddess of Mercy), 15th VIII Moon (Mid-Autumn Festival), 15th VII Moon (All Souls' Day) and the old style Chinese New Year.

The School.

For many years there was a village school, with a school mistress. She is now over 60 and is still in the village. She taught

the old classics. About two years ago a relative of the druggist came from China to the village and started a modern primary school. Money was subscribed and the Capitan told me that he paid \$50. A school was built and the village learnt of the existence of Dr. Sun Yat Sen and the Chinese National Government. The teacher imported a national flag and flew it on the October 10th Anniversary. After a year or so the teacher left because no one could pay the school fees and now the school house is empty and the children are working in the fields. One very old man teaches a little and his three or four pupils pay for their schooling by giving him paddy.

The Capitan China.

The present Capitan, Liew Chin Fook, is 41 years. He was appointed by Sultan Mohamed III in a letter of appointment dated 23rd August, 1918. The letter states that he is appointed as Capitan China of the daerah of Pulai which is the district of Ulu Galas. He is permitted to settle disputes amongst the Chinese. As a magistrate he may hear civil cases involving sums of not more than \$100. He can hear voluntary hurt but no grievous hurt cases, or 'cases with weapon,' or those in which there are broken bones or serious injuries. He can also hear private summons cases providing both parties agree.

The Capitan used to act as Magistrate until four or five years ago, but he then petitioned the Sultan to appoint some one else. Being ignorant of Law, he felt that he was not competent to act as Magistrate after the isolation of the settlement ended and the town of Gua Musang grew up. He could look after his own people but had no wish to become involved even as a Magistrate in cases in which outside Chinese were concerned.

Now his duties are more general although he still keeps a pair of handcuffs ready for use. There is a small Police Station on the edge of the village and there is a Malay Police Corporal in charge. The Capitan reports anything of interest to Government, and he accompanies European Officials on their visits of inspection. He is also in charge of the water ways.

The previous Capitan died when he was over 60 and his only surviving son was too young to be appointed. Apparently it had previously passed from father to son. The present Capitan was elected mainly because he could speak Malay well. It is doubtful whether he has much authority other than in his own family. His son has married the daughter of the previous Capitan. It is possible that he himself will keep his position until he dies, when his written authority will be returned to His Highness the Sultan.

He receives no salary but at the time of his appointment he was allowed to run gambling, but he only did this for one year

and was then told by Government that it would not be allowed in future. He is the only liquor and chandu licensee, and also possesses a gold buyers licence, so that he does obtain definite business advantages. He is a partner in a shop at Gua Musang and lives there with one of his three wives, visiting Pulai once a month only. His son is a boarder in a private English School at Kuala Krai.

Probably he will be the last Capitan now that Pulai is no longer isolated. The village is visited frequently by Government Officials and there does not now appear to be any necessity for any special official.

OUTLINE OF A MALAY HISTORY OF RIAU.

By R. O. WINSTEDT, C.M.G., D.LITT.

The following is a summary of the *Sadjarah Radja-Radja Riaue I*, being CCCLVIII of van Ronkel's Catalogue of Malay manuscripts belonging to the Batavian Society. I am indebted to the Society for the loan of the MS.

When Yang di-pertuan Raja Ismail was beaten in the Straits (*Selat*), he fled to Dungun where Sultan Mansur of Trengganu gave him the hand of his daughter; and the Yam-tuan Muda of Trengganu married Che' Puan Besar, namely Che Zini. Tengku Busu was angry and removed to Dungun, because Raja Ismail was a grandson of Raja Kechil. Tengku Busu was a son of Tengku ^{سنت}. Che Puan Besar was a granddaughter (*anak chuchu*) of Bendahara Tun Husain, full elder brother of Marhum Kuala Pahang (born before his father came to the throne). He induced his brother to give Tengku Bongsu to Raja Kechil in marriage and then said Raja Kechil was a commoner. (Others said that Raja Kechil was a son of Che' Pong by Sultan Mahmud and had been brought up by a Minangkabau Penglima Bibas). The rumours caused Tengku Bongsu to leave Raja Kechil and go to the house of her sister Tengku Tengah. So Raja Kechil departed. Thereupon the Bendahara wrote inviting him to attack Johor and promising to desert to his side. Raja Kechil attacked. The Yamtuan Muda of Johor continued his game of chess and then ran amuck and killed his wives and concubines and their children. The only children to escape were———, Raja Aminah, Tengku Raja Muhammad, and Enche——— wife of Tengku Senit (سنیت): they fell down among the corpses, pretending to be dead. The wife of the Yamtuan Muda was famous for her beauty and all her weaving apparatus was made of gold. A Pangan took Tengku Senit to Tengku ^{سنت} at Dungun. Marhum Besar with Tengku Bongsu (wife of Raja Kechil) fled to Pahang, where he was cut down on his praying-mat on his ship. "Tengku ^{سنت} his younger brother still has the blood-stained mat." Tengku Tengah came from the cabin dressed in fighting trousers and hacked at the murderers. She and her young brother, Sulaiman, still a boy in bracelets, were captured by the Minangkabaus and bound, till Raja Kechil released them and made them servants,—one carried his creese, another his betel-box. But Raja Kechil refused to raise the Bendahara to the throne. So the Bendahara invited Klana Jaya Putra to attack Riau. The attack succeeded but the Bugis too refused to crown the Bendahara. "A coconut-palm must succeed a coconut-palm and a betel-palm a betel-palm." The Minangkabaus attacked Riau several times before the death of Raja Kechil. After that Raja Alam attacked it and then Raja Buang ^{کوڈنگ}, son of Raja Kechil. "We" were

now all free from the danger of the Bendahara. The Klana asked "the late king" (*marhum*) i.e. Sulaiman to let the Bugis return to their own land. Instead Klana was made Raja Muda and given the insignia (*ketu terenang dan kumbokkan*). Klana married Che' Ayu of Perepat Sa-ratus *kepala Minangkabau*. His wife bore a daughter Raja Fatimah at Sungai Baharu. Daeng Ali married Tengku Mandak. Daeng Berani (= Purani R.O.W.) married Tengku Tengah and had a daughter Raja Maimunah. Daeng Ali succeeded Klana on his death as Raja Muda. Daeng Kembuja son of Daeng Ali married Tengku Fatimah. The Bendahara (Husain) still nursed resentment. Marhum Besar (i.e. *Sultan Sulaiman*) fetched Wan [✓] from Trengganu—he was a son of that State's Laksamana. The Yang di-pertuan Kechil of Trengganu, a boy in bracelets, visited Riau and returned. Then Marhum Muda di-Kota took Tengku Mandak on a visit to Selangor and later married Daeng Ma'asik, daughter of Arong Pala, in Selangor. At Riau he neglected her, so that Arong Pala returned to Celebes. Marhum Muda (i.e. Abdul-Jalil, Raja di-Baroh) conquered Perak from Selangor and brought back to Riau Enche' Samidah and si-Timah of Perak. The Yang di-pertuan of Trengganu married Tengku Tengah. Daeng Kembuja succeeded Marhum di-Kota. Marhum Besar attacked Raja Alam at Siantan, the Bendahara and Tengku Tengah guarding Riau. Raja Alam was at Siak and Marhum Besar took Siantan. The Dato' Bendahara and his Trengganu friends created trouble between Bugis and Malays, until the Raja Muda wanted to leave Riau, even putting his people into the ships. But the Marhum Besar sailed to Linggi. The Yamtuhan Kechil of Trengganu and the Bendahara created more trouble in Riau. The Dutch came. The Yang di-pertuan of Trengganu and the Bendahara wanted to hand over to the Dutch Raja Albinah (*sic*), Raja Halimah and Raja Haji. But Raja Puteh and Raja Hitam protested and the Bugis removed to Sungai Timun, where Raja Haji built a fort and fought the Malays, while the women fled to Sungai Batang. Marhum Besar sent Wan Dalam, the Yamtuhan of Trengganu and Raja Haji to Linggi to fetch the Raja Muda. But the Yamtuhan called at Malacca and asked the Dutch to attack Linggi and capture Raja Haji. A Bugis ^{*}*periy* overheard, and Raja Haji sailed off to Linggi. The Trengganu faction returned to Riau and wanted to take Marhum Besar to Trengganu. But Raja di-Baroh protested and the news of the Trengganu treachery leaked out. Raja di-Baroh and Indrabongsu go to Linggi and find (the Raja Muda) Marhum Janggut at Rembau. Raja di-Baroh dies and Suliwatang takes the body to Rembau. His father, Marhum Besar dies at Riau. Marhum Tengah becomes Sultan. Sultan Mahmud is only 40 days old. The Dutch claim \$77,754 for the Linggi campaign thrust on them by the Yang di-pertuan Selangor. The Bendahara Muda (? Tun 'Abdul-Majid), who went to Pahang, hands over Riau to Marhum

Janggut in return for his defraying the debt. The Bendahara Muda goes to Pahang, leaving at Riau the Bendahara Tua (? Tun Hasan), the Temenggong, Engku Busu and the Raja Tua. He never returned, not even when the Bendahara Tua died. The country prospered greatly and Marhum Janggut took no notice of Malay plots till discovering that Raja Tua designed to set fire to the powder magazine at Pengkalan Rama he banished him from Riau. Raja Ismail came ostensibly to visit the tomb of Marhum Besar. He swears this on the Koran and Marhum Janggut's officers are invited to watch his ships. While they are so doing Tengku Abdullah captures and beheads Dato' Bandar Amin, who sends his ring and a message by a boy page to Raja Negara to send to Riau. Marhum Janggut fights Raja Ismail in the Selat and defeats him. In Tengku Abdullah's ship are found letters from the Bendahara, Indrabongsu and Raja Tua inviting the Siak chiefs to attack Riau and remove the infant ruler to safety. News coming that Raja Ismail has married the daughter of the Yamtuan of Trengganu, Marhum Janggut—in spite of the fact that the Yamtuan was a son-in-law and cousin of Marhum Besar who had laid a curse on any of his house who made peace with the house of Raja Kechil. Marhum Janggut, however, paid no heed to Malay jealousies and was fair to all races. Marhum of Teluk Ketapang, Raja Haji, succeeded. Raja Indrabongsu followed Tengku Fatimah to Trengganu. Every year the Bendahara of Pahang sent letters to the Dutch, Bengal, Madras, Bombay, Batavia, asking help to fight the Bugis at Riau. The Trengganu ruler gave a Captain Glass si-Jemilah in the ship of Captain Geddes at Kuala Ibi (جلاس)، where he was wrecked with 110 other boats. Enche' Abdullah son of Tuan Imam Lebai Pandak composed for Van Braam a letter to the Sultan of Trengganu so rude that the Sultan could not read it in public. He read it privately to his son Tengku Bongsu, and to Tengku Tengah, Tengku Lahad, Tengku Sih and the son of Tengku ... There follows a conversation full of riddling proverbs between one Enche' Jumat and Tengku Mandak on the birth of an illegitimate son to the Yamtuan.

In 1103 A.H. Sultan Sulaiman was installed ruler of Johor and Pahang; Tun Abbas was made Bendahara Sri Maharaja; Klana Putra became Raja Muda Sultan Alaedin. When Klana Putra died in 1141 A.H. he was buried at Sungai Baru. Raja Tua came from Trengganu bringing Engku Raja Indrabongsu and Engku Siwa Raja and installed Daeng Ali as Raja Muda. Raja Tua died and was buried at Sungai Baru in 1147 A.H. and his nephew Tun Abdullah became Raja Tua. In 1158 A.H. the Yamtuan Muda died and was buried at Kota, being succeeded (after a visit to Selangor) by Daeng Kemboja. In 1161 A.H. the oath between Bugis and Malays was renewed, the Yamtuan Besar, the Yamtuan Muda and Engku Raja Indrabongsu taking part. Next

Engku Raja Indrabongsu was created Bendahara Sri Maharaja (28 Rejab 1161 A.D.). In the same year also it was arranged that the Yamtuan Muda should try Bugis offenders and the Bendahara Malay offenders. Maulana Saiyid Abdullah bin Muhammad al-Kudsi *kuddasu Allah* is mentioned. In 1166 A.H. the Yamtuan Muda removed to Linggi and sent a message to Riau to ask if the oath between Bugis and Malays still held good. The Yamtuan Besar died. Then his son died and was taken by Suliwatang to Linggi, where all the chiefs had audience of the Yamtuan Muda and begged him to cherish all the descendants of Marhum Besar.

'ABDU'L-JALIL, SULTAN OF JOHORE (1699-1719),
'ABDU'L-JAMAL, TEMENGGONG (ca. 1750)
AND RAFFLES' FOUNDING OF SINGAPORE.

By R. O. WINSTEDT, C.M.G., D.LITT. (Oxon).

Among Malay MSS. which I have had for nearly twenty years I recently unearthed the short MS. here summarized. Unfortunately I found it after my *History of Johore* had been printed. It professes to be compiled from tradition and clearly was written in Pahang.

The MS.'s genealogies before the XIXth century are wild and unreliable. It professes to add to our knowledge of Sultan 'Abdu'l-Jalil, founder of the present dynasties of Trengganu, Pahang and Johore, but whether its apparently romantic material is authentic seems doubtful. The MS. seems to put thirty years too late the famous old Laksamana Paduka Raja who fled to Trengganu and died there in 1688 (JRASMB., vol. X, 1932, Pt. I, pp. 57-8, Pt. III, p. 51), or was the same title given to a successor? It is improbable.

The account of 'Abdu'l-Jamal gives us our first real glimpse of that Temenggong, corroborating and expanding chance references to him elsewhere (*ib.* p. 148). It suggests a date for his death: he must have perished apparently before Sultan Sulaiman, who died in 1760. Unfortunately while the historian records the smallest details of Pahang happenings, he has few and inaccurate details for Riau and says nothing of the successor to this Temenggong. In fact he speaks as if 'Abdu'l-Jamal had only two sons, both of them killed by the explosion which killed their father. But there is irrefragable evidence (*ib.* pp. 71-73) that he had a third son, Engku Muda, who along with his Bugis mother, Raja Maimunah, the daughter of Daing Parani, ruled Riau (after the Dutch had ousted the Bugis) and died at Bulang after 1806. It is however now clearer than ever why the children of Temenggong 'Abdu'l-Jamal adopted the title of Daing from their mother. It is just possible that the Temenggong's uncle, Sultan Sulaiman, suspected 'Abdu'l-Jamal of being too thick with Raja Maimunah's Bugis relatives and so showed favour to the family of his other nephew, Bendahara 'Abdu'l-Majid, favour which Temenggong 'Abdu'l-Jamal resented so fiercely that he killed Che' Engku Besar 'Abdu'l-Mutalib, son of 'Abdu'l-Majid and his own nephew. It is certain that from 1760 to 1785 the Bugis were all-powerful at Riau. And it was natural for Raja Maimunah to bring up her children, when their father Temenggong 'Abdu'l-Jamal had apparently inherited the mental instability of their grandfather, Temenggong Tun Abbas (*ib.* Pt. I, p. 62, Pt. 2, p. 317).

If this MS. is correct in calling 'Abdu'l-Majid *Bendakara* before Sultan Sulaiman died in 1760, then my tree (*ib.* Pt. III,

p. 150) may be wrong in making 'Abdu'l-Jamal Temenggong before him, unless the latter were passed over for the post of Bendahara for eccentricity; and 'Abdu'l-Majid must have been Bendahara of Pahang simultaneously with Hasan Bendahara at Riau, unless the *Tuhfat* puts the death of Bendahara Hasan too late. A Riau MS. described elsewhere in this number states that about 1761 a Bendahara Muda handed over Riau to Marhum Janggut (in return for his paying the Dutch the cost of the Linggi war) and retired to Pahang, never returning to Riau, not even when the Bendahara Tua died there. This Bendahara Muda must surely be 'Abdu'l-Majid, the founder of the permanent Pahang Bendahara dynasty.

This MS. gives us the name of the Bendahara of Pahang who was drowned about 1802 (*ib.* p. 150 and vol. X. Pt. I, p. 61), and furnishes new particulars of his death. It records one new detail of the landing of Raflies at Singapore. A Malay named Che' Salleh, took him to the Temenggong.

Summary of MS.

While Megat Sri Rama was attacking Linggi, Sultan Mahmud murdered the Megat's wife for taking a pip of a jack-fruit. Bendahara 'Abdu'l-Jalil counselled patience, but his younger brother who was Temenggong declared the Sultan's conduct was intolerable. If the Sultan was killed, 'Abdu'l-Jalil would become ruler and the Temenggong Raja Muda. So the Bendahara seized and killed the captain who guarded Sultan Mahmud. Megat Sri Rama stabbed the Sultan, as he was being carried to bathe, and was himself slain.

The new Sultan 'Abdu'l-Jalil found Che' Mi, daughter of the Laksamana, pregnant by Sultan Mahmud and her father gave her to Panglima Bibas to take to Minangkabau. He appointed Wan Drahman Megat Laksamana and later Paduka Raja. But Wan Drahman's enemies stole a kerchief belonging to one of the Sultan's concubines and reported an intrigue between him and the girl. The Sultan decreed his death. But the Laksamana was aboard his ship (about to attack Lukut) with two famous cannons, Sri Johor and Sri Pasir, and resisted. He fled to Bari in Trengganu but Sultan 'Abdu'l-Jalil sent a letter and a creese to Trengganu ordering his execution. The Laksamana Paduka Raja was killed and buried at Tanjung Luang and his two cannons are still on Bukit Putri.

Now a younger brother of Sultan 'Abdu'l-Jalil, named Zain-al-'Abidin, was driven out of Trengganu by a son of the deceased Paduka Raja and went to Patani where he was adopted by the queen Nang Chayang. Sultan 'Abdu'l-Jalil sailed to Patani and married Nang Chayang. He also fell in love with her maid, a sweet singer, Dang Sirat, and took the girl for a ride on an elephant,

when a branch knocked a charm out of her hair and left Dang Sirat ugly, whereupon the Sultan killed her and people made a song

*Zaman zaman tekukor mati,
Mati di-bawah terong perat.
Zaman zaman Raja Johor mari
Mari membunuh Dang Sirat.
Dari Patani ka-Tanjong Kandis,
Di-tiup angin selatan daya.
Dari mula ia-nya manis
Rupa-nya Sultan kena perdaya.*

Sultan 'Abdu'l-Jalil made Zain-al 'Abidin Bendahara of Trengganu and returned to Johor.

Che' Mi bears a son, Raja Kechil, who captures Johor while its Raja Muda is playing chess. The Raja Muda kills his wives and all his children but one and dies fighting. Raja Kechil reigns over Johor.

Daing Parani comes to Johor. Tengku Mandak (*sic*) throws her earring into his lap and begs him to avenge her. A year later the Bugis drive Raja Kechil to Siak. But when the Bugis go back to Macassar, Raja Kechil retakes Johor and sends Nakhoda Sekam to Teluk Kandang at Pekan Pahang to kill Sultan 'Abdu'l-Jalil. 'Abdu'l-Jalil's son, Sulaiman, is installed Sultan by the Bugis. The fight over wood for fishing-stakes at Kuala Linggi and the Bugis attack on Riau (JRASMB vol. X, 1932, p. 318) are just mentioned. The Bugis leader Upu Klana Putra Jaya fetches Sultan Sulaiman from Pahang and marries a daughter of Temenggong 'Abdu'l-Jamal. They get a son Temenggong Daing 'Abdu'l-Majid who marries a Tun Khatijah and gets a son Temenggong Daing 'Abdu'r-Rahman who gets a son Temenggong Ibrahim, the father of Sultan Abubakar of Johor, the father of Sultan Ibrahim. (*Of course this pedigree is wrong*).

The rulers of Pahang are descended from Bendahara 'Abdu'l-Jamal, who was succeeded by 'Abdu'l-Jalil, who was succeeded by Husain, who was succeeded by Tahir, the first Bendahara of Pahang. Tahir had five children: Tun 'Abdu'l-Majid Bendahara of Pahang, Tun 'Abu'l-Jamal Temenggong of Riau, Tun Muhammad of Trengganu, Tun Yusuf of Tembeling and Tun 'Abbas of Semantan! (*Again the genealogy is wrong*).

Now Tun 'Abdu'l-Mutalib, a son of Bendahara 'Abdu'l-Majid, lived at Pekan, while Tun Muhammad lived at Chenor, Tun Koris at Endau and Deh at Pedah. One day Bendahara 'Abdu'l-Majid took his son 'Abdu'l-Mutalib (*i.e.* Che' Engku Besar JRASMB, Vol. X, 1932, Pt. I, p. 60) to Riau and the Sultan invited the young man to feed with him, while the sons of Temenggong 'Abdu'l-Jamal, namely Daing Chela' and Daing Busu, waited on them. The Temenggong was bitter over this. Later when he and his

two sons followed Sultan Sulaiman to Pahang, the Temenggong waylaid 'Abdu'l-Mutalib at the back of his father's house and stabbed him to death with a spear. Sultan Sulaiman's men chased Temenggong 'Abdu'l-Jamal to Padang Buloh where Che' Engku Yahya arrested him and took him to Tanjung Parit and handed him over to Bendahara 'Abdu'l-Majid. Tun Koris wanted to stab him but the Bendahara stayed him, saying "He is your uncle and he is mad." "Kill me and my two sons" said the Temenggong, but Sultan Sulaiman ordered that they should return to Riau. At Kuala Ayer Hitam the Temenggong threw into the river the spear he had used to stab his nephew. Near Kuala Rompin his concubine Bernas bore a dead child at a spot still called Pantai Bernas. At Penyusok the Temenggong captured a sailing craft, after slaying her crew, and towed her to Riau, wherefore people made a song

Besar hulat di-buku kayu,

Anak Belanda bermain sekopong.

Besar daulat Raja Melayu,

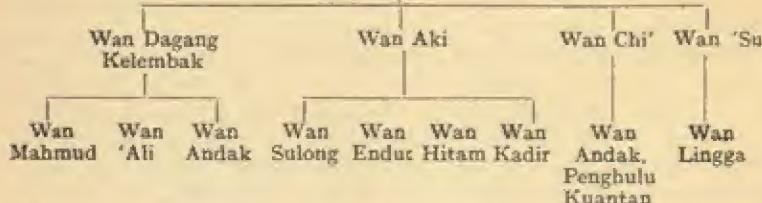
Kochi di-tunda dengan jongkong.

At Riau the Temenggong went into the cabin of the (*sa*) *kochi* with a light. The gunpowder was set on fire and he and Daing Busu were killed on the spot. Daing Chela' was burnt and died later:—according to the *Tuhfat* he was alive in 1761 when Mahmud was installed Sultan of Lingga.

Now Tun Muhammad hurried from Chenor with 40 warriors to catch the Temenggong. In the reach at Kuala Lepar he had the kitchen-place thrown overboard to make his boat faster. At Pekan he learnt that the Temenggong had gone to Riau and, though his father Bendahara 'Abdu'l-Majid forbade it, he pursued. Hearing that Temenggong 'Abdu'l-Jamal and his sons were dead, Tun Muhammad settled at Riau. Bendahara 'Abdu'l-Majid died and Tun Muhammad (= Che' Engku Sentul, *ib.* p. 60) was installed and sailed to Pahang. He visited Sedili and Tiuman and from thence, in spite of protests, crossed to Endau and was drowned with his wife (*gundek*) on the bar. All his 40 boatmen were executed by Tun Koris for not dying with their chief and were buried two or three in a grave: only Haji Zakri and Lebai Rejab escaped to the house of Tun Jambul, *mantri* to Bendahara 'Abdu'l-Majid. The descendants of the drowned Bendahara are

Bendahara Tun Muhammad

Tun 'Abdu'l-Kadir



Tun Koris became Bendahara and had two sons, Tun 'Ali and Tun Muhammad.

Tun 'Ali succeeded his father as Bendahara and had ten children: Tahir, Panglima Besar Ismail of Chenor, Ahmad of Pekan Saberang, Mansur of Kampong Marhum, Hasan of Bruas, Wan Sulong, Wan Teh, Wan Sunib, Wan Esah, Wan Andak.

Tahir, son of Bendahara Tun 'Ali, had nine children: Tun Koris, Tun Uthman, Tun Deh, Tun 'Abdu'llah, Tun Muhammad, Tun 'Abdu'r-Rahman, Engku Puan Ngah, Che' Wan Nit, and Che' Wan Chik who married Sultan Abu-Bakar of Johore.

Che Wan Sunib, daughter of Bendahara Tun 'Ali married Wan 'Abdu'llah, younger brother of Sultan Abu-Bakar. Her sister Wan Esah married Tengku Kechil, a Johore Raja.

(I omit later Pahang genealogies and reference to the constitution organised by Ahmad, first Sultan of Pahang. Also the genealogy of the Sultans of Lingga.)

When Raffles came to Singapore, he asked Che' Salleh who was the raja and Che' Salleh took him that evening to Temenggong 'Abdu'r-Rahman. Raffles wanted to enthrone him but the Temenggong sent Che' Engku Yahya to Che' Abu Puteh to invite Tengku Husain to come to Singapore to fish. Raffles installed Husain as Sultan. Temenggong 'Abdu'r-Rahman wrote to Bendahara 'Ali in Pahang, who replied that he would continue his allegiance to Daik (Lingga) and not recognise Singapore.

At 4.45 p.m. on 14 May, 1914 Ahmad, first Sultan of Pahang, died and was succeeded by Mahmud. On 19 June, 1917 Sultan Mahmud died and was succeeded by 'Abdu'llah.

The MS. ends with notes on the Pahang regalia, dress and betrothals and weddings, birth, burial and coronation ceremonies.

NOTES
on
**THE EDUCATIONAL POLICY OF SIR STAMFORD
RAFFLES.**

By G. G. HOUGH, RAFFLES COLLEGE, SINGAPORE.

Sir Stamford Raffles was the founder of English education in Malaya. It might therefore be of interest to examine his educational projects and to see how far they coincide with and how far they differ from the practice of the present day. Raffles has left us an account of his educational schemes in two minutes—one dated 1819 on the establishment of a Malay College at Singapore,¹ and one dated 1823 giving an account of the foundation and policy of the Singapore Institution.² The later unfortunate history of the Singapore Institution has been told elsewhere and is not our concern here. We are only occupied with Raffles' intentions and with the Institution as originally founded by him. In the 1819 minute we have an account of Raffles' motives for wishing to found a college, the objects he hoped to attain and the methods he proposed to employ. In the paper on the Singapore Institution, four years later, we see the materialisation of his ideas.

We must remember that the social and political conditions which Raffles had in mind were not those of our own day. At that time Bencoolen and the British claims in Sumatra had not yet been surrendered to the Dutch, and the respective spheres of influence of the Dutch and the British in the Archipelago had not been defined. Raffles opens the 1819 minute with an extremely interesting survey of the Malayan peoples, in which he obviously regards the whole region—the British Malaya and the Netherlands Indies of our day, as a single entity. His educational schemes therefore were designed to include not only the principal peoples of the Peninsula to-day, but also the Javanese, the Bugis and the other island peoples. He even extends his scope to the Siamese and includes Siamese as one of the principal languages of the Peninsula. His projects had thus a far wider range than any that would be possible now.

Raffles points out that it was commerce rather than conquest that had inspired British policy in the East: and that commerce is a powerful agent, dangerous if not properly controlled. "It creates wants and introduces luxuries; but if there exists no principle for the regulation of these, and if there be nothing to check their interests, sensuality, vice and corruption will be the necessary results..... Education must keep pace with commerce, in order that its benefits may be ensured and its evils avoided."³ He then proceeds to give an account of the peoples on whom this education is to be bestowed—an account which must still be the best brief survey of Malaya, its various races and their social and

political conditions in the early days of European influence. He comes to the conclusion that no Eastern people are more apt to receive education or put fewer obstacles in the way of its communication. "There is nothing perhaps which distinguishes the character of these islanders from the people of India more than the absence of inveterate prejudice and the little influence Mahomedanism has over their conduct and mode of thinking. With them neither civil nor religious institutions seem to stand in the way of improvement, while the aptness and solicitude of the people to receive instruction is remarkable."⁴

Institutions in the nature of colleges were formerly maintained by the native princes in Bantam, and the interior of Java and Sumatra, particularly at Menangkabau, but they had disappeared with the power of the states which supported them. In Raffles' day their place was very imperfectly supplied by inferior Mussulman teachers, many of them little better than imposta.⁵ One of the considerations which impels Raffles to the foundation of an educational establishment is "that it is in great measure due to the influence of Europeans and to the ascendancy they have acquired in these seas that the decline of the people in wealth and civilization is to be ascribed, and that the same cause has contributed to take away the means of instruction they formerly possessed."⁶

Otherwise, Raffles' educational projects seem inspired by the humanitarian spirit characteristic of the later eighteenth century in which his earlier years had been passed; a spirit enlightened without being visionary, and practical without being narrowly utilitarian. He sets forth his motives in language more formal and explicit than we should use to-day, but they are none the worse for that. "While we raise those in the scale of civilisation over whom our influence or our empire is extended, we shall lay the foundations of our dominion on the firm basis of justice and mutual advantage instead of the uncertain and unsubstantial tenure of force and intrigue."⁷

In proceeding to the type of education which Raffles recommended we must remember that he was writing fifteen years before Macaulay's famous minute, which did so much to affect English education in the East. Confronted by the alternatives of an education for Eastern peoples in Eastern tongues, and a transplantation of the ordinary English education into alien soil, Macaulay decided wholeheartedly in favour of English: with the result that in 1835 the Indian government issued a Resolution on education stating that "the great object of the British Government ought to be the promotion of European literature and science, and that the funds appropriated to education would be best employed in English education alone."⁸ Hence no doubt much that is good; but hence also Babuism, worthless B.A. degrees, Cambridge Examinations, the study by small Tamil children of paraphrases of Shakespeare's Twelfth Night—and all the rest of it.

But Raffles, in 1819, was unaffected by ideas of "English education alone." His idea was rather to improve the standard of education in the native languages, and to give in addition some instruction in English and in western science to those who seemed best able to profit by it.

He seems to have had no immediate idea of universal popular education. The England of his day had not been moulded in elementary schools. His idea was to educate the country from the top downwards. He speaks of the advantage of educating the higher classes "to whom alone we are to look for effectually promoting the progress of improvement among the lower orders,"¹⁷ and he condemns "any scheme which should reverse the order, and commence instruction from the bottom rather than the top of the scale. In every country the lights of knowledge and improvement have commenced with the higher orders of society and have been diffused from them downwards. No plan can be expected to succeed which shall reverse their order, and attempt to propagate them in opposite directions."¹⁸ Among the higher classes he is thinking firstly, it appears, of the Malay chiefs, but he recognises also the position of the Chinese "many of whom have raised themselves by their talents to opulence and a respectable rank in society." He remarks too that these men in his time frequently sent their sons to China for education, for want of a suitable local college.

Another salient feature of his college is that it was to serve as a centre for the collection and ordering of the traditions and history of Malayan peoples, and for scientific observations of Malayan lands. It was also to instruct all those Englishmen who, like Raffles himself, cared to know something of the teeming, various life of the East. His intention was thus to create something far greater than a mere distributing centre for second-hand Western culture; he wished to establish, as Mr. Coupland says in his life of Raffles "a permanent centre for the study of the languages and life of all this Eastern world in which he moved."

Raffles himself summed up the objects of his institution thus:—

"First. To educate the sons of the higher order of natives and others.

Secondly. To afford the means of instruction in the native languages to such of the Company's servants and others as may desire it.

Thirdly. To collect the scattered literature and traditions of the country, with whatever may illustrate their laws and customs, and to publish and circulate in a correct form the most important of these, with such other works as may be calculated to raise the character of the institution, and to be useful or instructive to the people."¹⁹

When we come to the 1823 paper, on the actual foundation of the Singapore Institution, we find that these projects are sub-

stantially realised. The institution was to consist of three departments, a scientific department, a literary and moral department for the Chinese,⁹ and a literary and moral department for the Malays and kindred peoples. The curriculum is impressive, not to say formidable. The Malay department of the College was to be staffed by a Principal, a professor in the Malayan languages, a professor of Siamese, and native masters in Malay, Siamese, Bugis, Javanese and other languages of the Archipelago. The Principal was "to teach native students the English language, geography, the use of the globes, arithmetic, history and such other branches of knowledge as circumstances may direct."¹⁰ The Professors were, with the aid of the native masters, to teach the native languages to Europeans and to teach native students "history, logic, theology natural and revealed, ethics or moral philosophy." The native masters "are to teach the correct reading and understanding of the most approved works and translations in the native languages and to assist foreign students in learning these languages and their characters."¹¹

The scientific department was to have a professor of natural history and natural philosophy. "The professor of natural philosophy shall be expected to teach, in the English language to native students and others, the principles of the Newtonian system of astronomy; the mechanical and chemical properties of matter; and illustrate them by experiments." And we are told that Dr. Montgomery, the then holder of the chair was also willing to give lectures in anatomy and medical science. "The professor of natural history shall be expected to be versed in whatever concerns the animal, mineral and vegetable kingdoms; and shall not only teach zoology, botany and mineralogy to the students, but shall exert himself to procure new information on these subjects from the surrounding countries, to be transmitted to the home Committee of co-operation: and shall do his utmost to procure satisfactory answers to such questions as may be sent out, by scientific individuals or bodies, through the medium of the home Committee."¹²

The officers of the College are charged at all times "to cherish a paternal feeling of kindness to the students; to set an example of patience, moderation, good temper and assiduity; and to avail themselves of every opportunity to inculcate lessons of morality and true piety, considering the religious and moral instruction of the students as no less intended by the Malayan College than their intellectual education." Students of all religions were to be admitted on equal terms: neither native students nor native masters were compelled to attend Christian worship: and a fine example of tolerance is found in the precept that native masters and teachers shall be "correct moral men, according to the opinions of their own nation."¹³

The scheme was an ambitious one and it was perhaps impossible that it should succeed entirely. Unhappily a course of hostility and mismanagement suspended its activities very early. For its

own day it was an amazingly advanced conception. The Singapore Institution was founded in 1823: No government provision for education was made in England itself until 1847, and not until 1871 was state-supported education at all widely established. Regular instruction in the natural sciences was given in Singapore at a time when the schools and universities of England had not even begun to wake from their long classical dream. And the whole plan shows a broad, enlightened and disinterested spirit. But it is perhaps not correct to call that spirit advanced: it is rather a survival from the liberal, cultured eighteenth century, before Victorian and neo-Georgian utilitarianism had begun to infect the world.

The divergences from the usual modern educational practice in the East are obvious. The first is the alliance of an Anglo-Oriental College with the study of Eastern languages, literature, history and sciences. Raffles intended the college to be a real centre of local research. The second is the insistence on the study by Eastern students of their own languages and traditions, as well as those of the West. We, having chosen another path, must continue to follow it, and do what can be done to make English culture real and intelligible to Chinese, Malays and Indians. But it is possible that Raffles' path would have led us quite as far and through more interesting country. After reading these two papers the impression remains that Raffles has left us the plan of something far better than anything that has yet been built. It is a common place to say that Raffles was far in advance of his time: it seems probable that he was also far in advance of ours.

REFERENCES.

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2. The Singapore Institution (foundation, regulations, curriculum, etc.), 1823. *ibid* Appendix p. 74.
3. 1819 Minute. Memoir. Appendix p. 24.
4. *ibid* p. 32.
5. *ibid* p. 36.
6. Resolution of Governor-General in Council, March 1835: quoted in Cambridge History of India, V. A. Smith, 1922.
7. 1819 Minute. Memoir. Appendix p. 35.
8. 1819. *ibid* p. 33.
9. This department was to be supplied by the removal to Singapore of the Anglo-Chinese College, then established at Malacca, under the presidency of Dr. Morrison. But the proposal to amalgamate the Anglo-Chinese College with the institution was never carried out.
10. 1823 Minute. Memoir. Appendix p. 80.
11. *ibid* p. 78.
12. *ibid* p. 79.

NOTES ON SOME ANCIENT GOLD COINS, FROM JOHORE RIVER.

By G. B. GARDNER.

When investigating the ancient sites on the Johore River, I obtained several gold coins. I took the first I got to the Raffles Museum, Singapore, and found that little was known about them. They possessed two (in an envelope) marked: "2 unknown coins from Trengganu." They had been found there, but it was known that they came from Johore.

The Museum authorities were kind enough to send me all the literature they possess on the subject—viz. Millies and Bucknell—Millies illustrates 3 large coins and 2 small ones from Johore. These were coins of Sultan Abdul Jalil, Mahmud and Sulaiman Shah. Bucknell describes 4 gold coins, which were said to have come from Trengganu, but which he believed to have come from Johore. All Abdul Jalils.

I took my coins with me when I went on home leave in 1932, and submitted them to the British Museum which possesses a Mahmud, an Abdul Jalil and Malik al-Adil. No information other than that in Millies and Bucknell was available.

Casts were sent to the Amsterdam, Leiden and Batavia Museums, but I could get no further information.

I have made drawings of my coins as follows, as a photograph does not give full details.

To make the series as complete as possible, I have copied a coin of Sulaiman Shah from Millies and by the kindness of Mrs. Edmunt of Kota Tinggi I have been able to illustrate a large coin of 'Ala'u'd-din.

Malays call all these coins whether large or small, Dinars but for convenience I call the large ones Dinars and the small ones $\frac{1}{4}$ Dinars. (I think the $\frac{1}{4}$ Dinars would be Hamilton's Mace).

Note.—Md. stands for Mahmud, A.J. Abdul-Jalil, A. 'Ala'u'd-din and M. for Muzaffar Shah.

No.	$\frac{1}{4}$ Dinar pieces.	Sultan to whom I assign them.	
1.	Sultan Muzaffar Shah	8 sided	M.
2.	" "	reverse of above.	
	(This coin is an error, as inscription is reversed).		
3.	Sultan Mahmud Shah	8 sided	Md. II.
4.	" Abdul Jalil Shah	clipped round	A.J. II.
5.	" Abdul Jalil	8 sided	A.J. III.
6.	" Abdul Jalil Shah	8 sided	A.J. II.
7.	'Ala'u'd-din	8 sided	A. I or II?
8.	" Malik al-Adil	round	?
9.	" Reverse of No. 8	round	



No. 1.
Sultan
Muzaffar Shah
Weight 9-9-87.

No. 2.
Khallatu'l-Mumin
(Reverse of
No. 1.)

No. 3.
Sultan
Mahmud Shah
9-9-60 (clipped).

No. 4.
Sultan Abdul
Jall Shah
9-10-02.

No. 5.
Sultan
Abdul Jall
9-9-85.

No. 7.
Sultan
'Ala'u'd-din
9-11-10 (Includ-
ing Ring.)

No. 10.
Sultan
Abdul Jall
9-39-35.

No. 8.
Malik al-Adil
9-11-33.

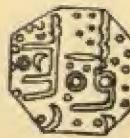
No. 9.
(Reversed
No. 8) (Inclu-
ding Ring.)

No. 11.
Sultan
Abdul Jall
9-39-45.

No. 6.
Sultan Abdul
Jall Shah
9-10-08

No. 12.
Khalifatu'l-Mumin
(Reversed
No. 11.)

No. 13.
Sultan 'Ala'u'd-din



No. 14.
Sultan
Murafar Shah
9-39-80

No. 15.
Khalifatu'l-Mumin
(Reverse of
No. 14.)

No. 16.
Sultan
Sulaiman.

No.	Dinars	Sultan to whom I assign them.
10.	Sultan Abdul Jalil	8 sided A.J. III.
11.	" Abdul Jalil	round A.J. IV.
12.	" Reverse of No. 11	round A.J. IV.
13.	" 'Ala'u'd-din	8 sided A. I or II.
14.	" Muzaffar Shah	8 sided M. II.
15.	" Reverse of No. 14	8 sided M. II.
16.	" Sulaiman Shah	8 sided S. I.

All these coins have the same reverse, viz: Khalifatu'l-Mumin, (figs. 12 and 15) with the exception of No. 8 which bears a conventional flower (fig. 9).

Three of the coins, viz. both the 'Ala'u'd-dins and the Malik al-'Adil Nos. 7, 13 and 8 have small rings attached, so they can be worn as charms.

None of the Johore coins is dated, or bears any indication of when it was issued. They have only the name of the reigning Sultan, and as there were 5 Sultan Abdul Jalils, 2 Mahmuds, a Muhammed and 2 'Ala'u'd-dins, it is not easy to assign dates to them definitely, but tentatively I assign these coins to the following periods, in the hope that discussion may bring out further facts and *coins*.

Nos. 4 & 6.

I think these were struck in the reign of Sultan Abdul Jalil Shah II, 1580—1597. As his predecessor, Abdul Jalil Shah I, the child king, who died at Seluyut in 1580, reigned less than a year, I doubt if he had any coins struck. The name on these coins is written عبدل جليل which is the natural way to write it so perhaps these coins are the earliest issue bearing this name.

Nos. 5 & 10.

To Abdul Jalil III, 1623—1677, I think we can assign the coins stamped عبدل جليل

Nos. 5 & 10.

The Abdul sprawls over the coin in an unnatural way, suggesting that this Sultan had his name written in a different way to distinguish his coins from those of his predecessors.

No. 11.

I think we can credit this big round coin with عبدل جليل on it to Abdul Jalil IV 1699—1719. This Sultan was of a new line, and may have made his coins a new shape for this reason. Also he had much intercourse with Europeans, and this may have influenced him.

Nos. 7 & 13.

These two coins are stamped 'Ala'u'd-din. There were 2 Sultans of this name, one reigning 1529—1564 who fought so long against the Portuguese and was killed at Johore Lama, and the other 1597—1613, who was taken prisoner and died at Acheh. I cannot give any good reason to assign these coins to one or other of these Sultans. Both coins have been mounted and worn as charms.

No. 3.

This coin stamped Mahmud Shah was, I think, issued by Mahmud Shah II, 1685—1699, who was murdered at Kota Tinggi (Sultan Mati di Julang Sultan Darah Puteh), because Mahmud Shah I was the Sultan at Malacca, who was expelled by the Portuguese and fled to Pahang. Later, about 1523, he came to Johore Lama, where he died in 1526. I doubt if he issued coins during his brief stay at Johore Lama. From d'Albuquerque's "Commentaries" Vol. 3, we know that he issued coins in Malacca. The only other Mahmud of Johore, was Mahmud III, 1761—1812.

Nos. 1, 2 & 12.

The only coins in my possession which I can date at all accurately are those of Muzaffar Shah, 1564—1580.

The small coin Nos. 1 & 2 is a curious error—the inscription being reversed. I presume that in 1564, when Muzaffar Shah came to the throne the local smith was told to make some coins, and being illiterate himself, someone wrote out the inscription for him, which he faithfully copied out on his die, struck a number of coins which looked alright to him, and it may have been some time before it was noticed that the inscription was backwards—then a new die was made with the wording reversed, so that it went the right way.

No. 16.

The coin illustrated by Millies, stamped Sulaiman Shah, must have belonged to the Sulaiman, whom the Bugis put on the throne of Johore and Rhio in 1722. There were no other Sultans of this name in Johore.

Nos. 8 & 9.

The coin stamped Malik al-Adil (The Just King), ملک العادل with a conventional flower on the reverse is a puzzle.

A number of tin coins were dredged up in a Malacca river some years ago; one of these had one smooth side while the other was stamped Malik al-'Adil. (See Hanitsch J.S.B.R.A.S. 39, 1903 and 44, 1905).

At the same time another tin coin was found which had a blank side, the other side bearing a device very like this conventional

flower. Dr. Hanitsch thought this was a Portuguese coin of Goa and the device was the wheel of St. Catherine, the Patron Saint of Goa. His illustration does not look like a wheel to me, and the Portuguese accounts say that they struck money at Goa in gold, silver and copper, but *not tin*.

On page 215, J.S.B.R.A.S., 1905, Hanitsch wrongly gives a translation of Malik al-Adil as full weight currency or legal tender." There are, I believe, coins issued in Borneo, inscribed Sultan Adil, which must mean the Just Sultan, there are coins of Pontianak and also copper coins issued by the East India Company, stamped with a pair of scales and Adil, which is understood to represent just weight or legal currency. They may be of Kelantan or Acheh, but I cannot trace the use of the flower in either State. It was *the King* or the Legal Tender of *the King*.

I also obtained four 6 sided tin coins from the Johore River: they are so defaced that they cannot be read, but the inscription seems to be Jawi. It is useless to illustrate them as they are so worn.

It has been said that these Johore coins were not real money, but that at the death of a Sultan they were struck to be thrown to the crowd at his funeral, that being given as the reason why they are only found in cemeteries. But we have d'Albuquerque's proclamation that no one was to use the money of the Sultans of Malacca, and persons having any in their possession must bring it into the Portuguese Mint, and have it re-coined as Portuguese money. This must have referred to real money, and not pieces whereby to remember a dead Sultan.

Hamilton, who visited Sultan Mahmud Shah in 1695, says that they had small gold coins called Mace (Mas) worth about 3/6 of English money. Mr. Vaughan who was shipwrecked off the coast of Johore in 1702 was given a bag of rice and a gold coin, with which to buy fish.

In 1614 Robert Quarkin, the English factor at Patani complains that 308 pieces of Johore gold he received in trade, were short weight, and Jourdain 1608—1617 in his reports says "it is very necessary to furnish our ships outward bound with rice and Jore Gold in Quoine." This looks as if Johore gold coins were better known to traders, than those of other eastern countries.

I quite agree that most of these coins have been found on the sites of old cemeteries, but these have usually been made on the sites of old forts and palaces, and the coins may have been there before the graveyard was made. Graveyards are also almost the only pieces of land being constantly dug up. Coins may be buried in many other places, but as the land is not dug, only scratched on the surface, coins that are 3 or 4 feet underground are not found. Also anyone who has visited the old tombs of the Sultans on the Johore River will have noticed how people still bring offerings

to the graves. Although they have usually forgotten their names, and while I have never seen money left there nowadays, I have no doubt that this may have been done in the olden days and I have heard a Malay nobleman tell the following story many times.

"Once when I was young, it was put to us that we should go and pray at the Tombs of our Ancestors—so I went with + and + (naming some high officials) to the tombs, and they said to me, 'You read the Koran, as you are clever.' So I stood at the head, and they stood on each side of the grave, and I began to read the prayers, holding the book before me. When I looked up, to my surprise, my companions had vanished. On lowering the book, I found that people had put a lot of 10 cent pieces amongst the offerings on the grave, and my friends were on all fours, scrambling for them, so I fell on my knees and prayed heaven to forgive their irreverence, but, first I made them give me my share, and I got \$1.20!"

This story shows, I think, that there was a tradition of putting money on graves, which would account for more coins being found in graveyards than elsewhere.

If anyone who reads this has any Johore coins that are not mentioned in my list, I should be very much obliged if they would send me particulars, as I should like to make the series as complete as possible.

POPULATION OF SINGAPORE IN 1819.

By W. BARTLEY, M.B.E., M.C.S.

It is generally accepted that at the time of the foundation of Singapore the island was completely undeveloped and that the inhabitants consisted solely of a few Malays living in huts on the banks of the Singapore River.

Both RAFFLES and the Munshi ABDULLAH mention Malays alone and although Captain Newbold writing in 1839 states that the population consisted of about 150 fishermen and pirates of whom about 30 were Chinese no authority for the statement was given and its correctness has been questioned.

In fact however not only were there Chinese inhabitants prior to the purchase of the Settlement but there was also a certain amount of agricultural development. The following excerpts from the early records of Singapore prove this beyond question.

A. Letter from W. Farquhar, Resident, to Lt. L. W. Hull, Secretary to the Lieutenant Governor (RAFFLES), dated 23.XII.22 (Vol. L 11 S.S. Records).

"The first hill lying to the Northward of the Government Hill is that of Selligie which in clearing the country at the commencement of the establishment was found to be occupied on the western side by a Chinese planter who had formed a gambier plantation there."

"The range to the westward of Government Hill towards Panglima Prang compound remains unoccupied with the exception of a portion of the North East side of the one near the western extremity of the old Malay lines where a Chinese gambier plantation had been commenced prior to our establishment at Singapore."

B. Letter from W. Farquhar, Resident, to Lt. L. W. Hull, dated 28.XII.1822.

"To various Malays and Chinese he (The Tummongong) has granted leave to clear grounds for plantations about 20 of which may have been commenced previous to the formation of the British Establishment."

C. In addition, the following acknowledgment of sale were made before the Registrar of Lands:—

TAN NGUN HA acknowledges on the 10.5.1822 "the sale of the gambier plantation formed by me on the western side of Mt. Stamford planted before the English Settlement" to Captain J. Pearl. TAN AH LOO on the same date makes an identical acknowledgment with regard to a gambier plantation on the South West side of Mt. Stamford.

"HENG TOOAN on the 13.5.1822 makes an identical acknowledgment with regard to two gambier plantations on the South East side of Mt. Stamford.

These acknowledgments will be found in Volume L 6 of the Straits Settlements records.

NOTES ON TWO UNCOMMON VARIETIES OF THE MALAY KRIS.

By G. B. GARDNER.

(Plate XIV).

During twenty years in Malaya I have heard many stories about *Keris Majapahit* and *Keris Pichit*, but I have seen only eight *Keris Majapahit* and three *Pichit* altogether.

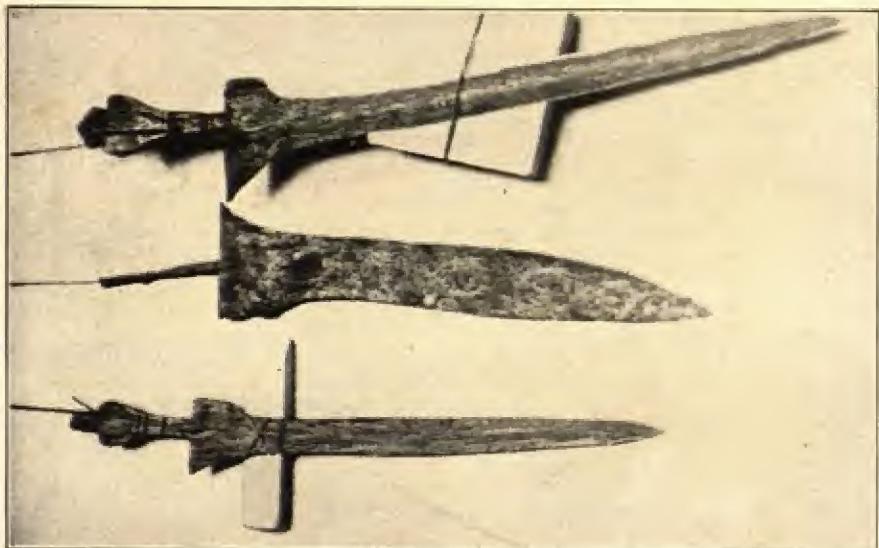
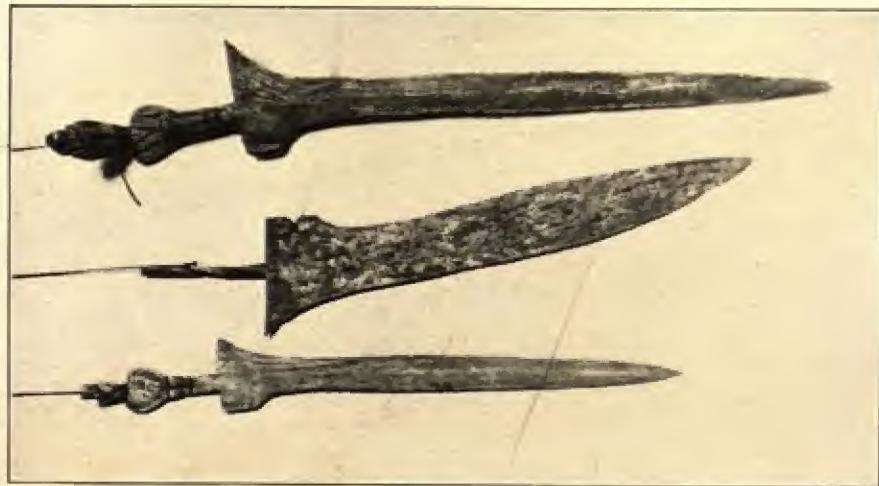
Of the *Majapahit* four are in the Singapore Museum; two of them being of the traditional form and two in my opinion being Chinese copies, of a much later date. The iron is different. There is no *pamur* (damascene) on the blade or hilt. The blade is much thicker and one is wavy. The figures are different. They stand instead of sit, and wear no head-dress.

The other two are of the traditional form, black iron with straight, narrow, thin blades. Blade and hilt are in one piece, and the *pamur* shows in both. The hilt is a little figure, sitting down with his hands on his knees, like a god to be worshipped, not hugging himself as if he were cold as in the well-known *Jawa Demam* type of hilt. The figure has a sort of hat on his head. Viewed from the back it looks very like a cobra sitting up to strike with head extended. All the others I have seen are of this type; of these, one belongs to a lady in Malacca, one is in the Pitt Rivers Museum at Oxford, and I have two.* Neither the British Museum, South Kensington, Wallace Collection, Tower, Windsor, nor any other Museum I have visited in England have a specimen, nor could they tell me anything about them. Professor Balfour of the Pitt Rivers Museum had an idea that they were currency bars and not weapons; but I think examination shows clearly that they were weapons, though it is possible that at one time they may have been used for barter, as brass cannon were in Borneo fifty years ago.

Of the *Keris Pichit* I have only seen three specimens: one belongs to a gentleman in Kedah, one is in my possession, and one I have lent to the Singapore Museum. These three are all very thin with *pamur* on the blades. Their special feature, from which they take their name *Pichit* (squeezed), is the round depressions on each side of the blade, which appear slightly raised on the other side, exactly as if someone had taken a strip of clay and squeezed it between the tips of his fingers. Or as if he had taken a red-hot blade, and squeezed it out with tongs shaped like the tips of his fingers. These *Keris* have apparently been made in the usual way, but the finger-marks seem to have been made during the process of manufacture, as the *pamur* follows through the finger-marks. These *Keris* have the usual tang to fit into a wooden handle. In both my *Keris* this tang has been twisted

* I believe that Raja Sir Chulan of Perak had a fine specimen.

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Gardner: Varieties of the Malay Kris.



during manufacture, in a way which I do not remember seeing in any other *Kéris*. The other *Kéris Pichit* I have seen, but I have not had the opportunity of removing the handle, so cannot say if the tang is twisted or not.

The only explanation I can suggest of the story of these *kéris* is that they are made in the ordinary way by some *Pawang* (Witch Doctor) the finger marks being hammered into the red-hot iron; then, at night, in the presence of witnesses, with much ceremony, the handle is heated red hot, and the *pawang*, with well oiled fingers, quickly pinches along the blade, and when it is cold shows the finger-marks as proof of his powers. I have been told of many *Pawang* who could make these *Kéris Pichit*, but it is always in the next district, and when I enquire there, the *Pawang* is always unknown, or dead! There may be *Pawang* that can do wonderful things but don't care to show off their powers, though I have tried to find one for years, without success. I should be glad to hear from anyone who has seen one of these creeses made. The finger marks may be simply put on with a hammer, but the weapons are so rare that I think there must be some basis for the story.

Various people have different stories about these two varieties of *Kéris*. The virtues and vices that one man will attribute to the *Majapahit*, another will assign to the *Kéris pichit*, and *vice versa*. A third will say that all *pichit* are *Majapahit* and all *Majapahit* are *pichit*, but from examining the few specimens I have seen I think this last story seems definitely wrong.

The usual story is that the *Kéris Majapahit* are very old. They are not wavy but small, slender and thin; the iron is black; the handle and blade are all in one and the handle is the figure of a man or a woman. Most people say these figures are male and female, the larger one male and the smaller female. All agree that they are very poisonous, nearly all saying, the depth of the white of a finger nail is enough to kill with a *Majapahit*. They are supposed to bring good luck to their owners, though some say a *Majapahit* is only lucky if it comes to you not by purchase but by inheritance or chance. Most people agree that they have a *hantu* (spirit), but how they get this spirit seems uncertain. One story is that it is the ghost of some one killed by that particular *kéris*, which became attached to it. Others say that the spirit was attached to it during the process of manufacture, that someone, usually a girl, was dedicated to it and her spirit enters into it:—one story is that she was killed during the ceremony, or died when it was completed, and that you can see her hair in the *pamur* on the blade. Others say that she did not die at the time, and could not explain why she should haunt the blade. Another story is that it is the *hantu* of some former owner of the *Kéris* who follows it. Some of these *hantu* are said to be male, but I have only heard stories of women being dedicated to a

Kēris. I am always afraid to suggest anything to my informants for fear of starting new stories, but the impression I got is, that at the back of people's minds is an idea that these *Kēris*, being so old and having had magic ceremonies performed over them during the making to attach power to them, may in time attract other spirits, either of people they have killed or of an owner whose spirit may follow the *kēris* after death. This is only an attempt to reconcile the various stories told to me.

Most people agree that these weapons are only lucky if the *hantu* likes the owner, and that you must treat them with respect. Other stories are that they banish all fear and that you can go anywhere in the jungle if you have one, as tiger, elephant and *seladang* would all turn tail if you showed one to them. Some say that they will jump about in the sheath to warn their owner of danger. Two men have told me that in a fight you simply draw the *kēris*, and it will guide your hand and fight for you, and one educated Malay told me seriously that I was a lucky man to have such a thing, as if it liked me I could simply stand still and it would jump out of my hand and fight for me. I have also been told that some of them will draw fire, that is, if a house is on fire and you point the *Kēris* at it and then slowly draw it to one side, the fire will follow the *Kēris* and leave the house. But these powers must only be used in a case of genuine need. If a fire is lit merely to test the powers of the *Kēris*, it will not work; or if it does, bad luck will ensue. The *hantu* does not like to be played with.

I have tried hard to find out what these *Kēris* really are. The name suggests that they come from *Majapahit*, in Java, the little state that became a conquering empire and destroyed Singapore about 1360 so thoroughly that it was almost uninhabited until Raffles occupied it at the beginning of the 19th century. *Majapahit* was destroyed by a combination of Muslim States in the 14th century. This would make these *Kēris* more than 600 years old, but Dr. van Stein-Callenfels, the Dutch archaeologist, assures me that they belong to the earliest Iron Age in Java, about the 4th century A.D., though he admits that scarcely anything is known about them. Many Malays have told me that long ago there was a great king named *Majapahit*, who made all these *Kēris*, squeezing out the red-hot iron with his fingers! Some say there are two kinds, the best being *Kēris Pichit*, which were made by King *Majapahit*, while the second best were made by his daughter *Negarunting*, and that only the latter have the figure on the handle. Most people agree that the *Kēris Majapahit* have the figure on the handle and have never heard of *Negarunting*, or else say it is just another name for *Kēris Majapahit*.

Raffles, in his History of Java, does not mention either of these weapons. He says "*I list some of the common varieties of Kēris.*" So he evidently knew of uncommon ones, and he speaks

of a king who found a bit of iron and made a *Kēris* out of it which points to iron being very rare and valuable at this time. He tells of a king of Majapahit who could squeeze red-hot iron and make it into *Kēris* with his bare hands, and how in Majapahit, smiths had great honour paid to them, being given grants of land, slaves, etc.

Apparently these *Kēris* date from a time when iron was rare, precious and mysterious and probably the smith used many charms and may have spread the story that iron could only be worked with the bare hands to discourage others from learning his craft and spoiling his trade. The charms were probably used to put a fighting spirit into the *Kēris*, possibly the spirit of a god, who is represented on the handle. Many *Kēris* from Bali have a deity on the handle. All the Majapahit *Kēris* I have seen, when viewed from the back, suggest a cobra, and it seems reasonable that a poisoned weapon should be dedicated to the snake god and the word *Naga* in *Negarunting*, would tend to confirm this theory. However coincidence killed the Professor, and one would welcome confirmation of this name for this type of *Kēris*.

Some say the *Kēris pickit* were made by the *Orang Wali* (saints or hermits). Others say they were made in the old days, either at Majapahit or elsewhere. I have alluded to the story that they were the original form at Majapahit, made by a King of that name with his own bare hands. Others say they can be made by any efficient *pawang*. Some people say they have all the powers, and more than I have detailed as belonging to the *Kēris Majapahit*. Others say they are simply a curiosity, but most people think they are lucky.

I shall be grateful if any of my readers can give me information, as to dates, where, when, and how these *Kēris* were made, and where I could see some more specimens, and of any stories concerning them. I have been told by Malays that there are *Kēris* that kill by pointing, and it is firmly believed that there is a *Kēris* in the Taiping Museum, that will get out at night, kill someone, clean itself, and get back into its case in the Museum before morning!!! But this story came to me through many mouths, and I cannot find out whether this *Kēris*, (if it ever existed) is one of these varieties or not. I do know two more or less self-acting weapons. One is the celebrated spear of *Parit Bakar* in Muar, Johore, called *Sembilan Puloh Sembilan* (Ninety Nine) because it killed ninety-nine people the last time it got loose. It always has its sheath tied on, and is kept tied up to the central *Tiang* (pillar) of the house, to prevent it getting loose again. It is said to have a *hantu*, and to rattle about when any member of the family is going to die. (When I was introduced to it and told the legend, I inadvertently asked if it rattled about or did anything when danger was imminent, and was told no. Since

then I have been cursed by people, as they say that now the story is that it does rattle about when danger is coming, and accuse me of having started this tale!)

I know another spear, near Tangkak, in Muar. The head is said to be made of *Tulang Mawas* (a mythical ape that had iron bones). It is said that this spear if thrown at random will always hit the mark. It failed when I tried it, but I was told that it should not be used in play. I was told several blood-curdling stories of how it had been thrown at random by night, and had always killed someone; also of its being used quite lately to drive off a *Pontianak* (ghoul) that attacked its owner, and could not be harmed by ordinary weapons. But I do not know any *Keris* that have first-hand stories about them.



1 A



1 B

Carey: Old Grave stones from Brunei.





TWO EARLY MUSLIM TOMBS AT BRUNEI.

By T. F. CAREY, M.C.S.

(Plate XIII).

While workmen were digging earth and stones near where it is popularly supposed that the palace of the famous Nakhoda Ragam was situated, two old grave-stones were dug up, with interesting inscriptions in a mixture of Arabic and Malay.

I. On one local pundits decipher the inscription

A.

تاریخ مرسل هجرة رسول سنة ٥٣٨
تیک بولن ٨ هاری بولن شعبان.
يوم الخميس.

*In the year of the Hijra of the Prophet 835 three months;
the 8th of the month Shaaban, Thursday viz. 11 April,
1432.*

B. On the reverse are the texts: "Death is a cup whereof
all men shall drink; Death is a door which all men must
enter."

II. On the other stone local pundits read

هجرة النبي المصطفى عليه افضل الصلة والسلام.
مو تاهن شريف هود مات.
فولغ كرحمه الله ٢٠ هاري بولن رباع الاول.
هاري اثنين وقبر صبح.
القبر باب وكناس دخله.

*In the year of the Hijra 905 Sharif Hud died returning
to the mercy of Allah on 20 Rabi u'l-awal, Monday and
was buried in the morning, viz. on 20 October, 1499.*

The stones appear to me to be a kind of granite and I think no such stone can be found locally.

Local opinion is averse to further digging in the spot for fear of disturbing the bones of the dead and I am afraid that we must be content with what we have got. The stones may form the beginnings of a Brunei Museum.

For the Christian dates I have used *Comparative Tables of Muhammadan and Christian Dates* by Lt.-Col., Sir Wolseley Haig (London 1932).

A Coin from Kedah.

By G. B. GARDNER.

I have in my possession an eight sided silver-copper alloy coin weighing 0.77 gram, which is said to have come from Kedah. Its specific gravity corresponds with an approximate composition of 70% silver. On submitting it to the Hon. Dr. R. O. Winstedt, C.M.G., he gave me the following translation of the inscription.

نَالِدِين Dziyau'd-din

سُلَطَان Sultan

١٠٧٦ 1076 = A.D.—1665

سَنَت Sanat

In Journ. Straits Br. Roy. Asiat. Soc., 81, 1920, p. 34 ("History of Kedah"), Winstedt gives the Sultans of Kedah as follows:—

Sulaiman Shah. (A.D. 1620).

Rijalu'd-din Shah.

Muhiyyu'd-din Mansur Shah.

Dziyau'd-din Mukarram Shah.

Ata'u'llah Muhammad Shah.

Muhammad Jiwa Zainal Shah (A.D. 1741—1778).



So Dziyau'd-din would be reigning about 1665. Millies, in "Recherches sur les Monnaies des Indigenes de Archipel Indian et de la Peninsular Malaise" illustrates some coins from Kedah. They are mostly round, but one tin coin is eight sided, and a coin of Muhammad Jiwa is dated 1154 (A.H.) = A.D. 1741-2. But he shows nothing exactly like my coin.

The illustrations are three times the size of the actual coin.

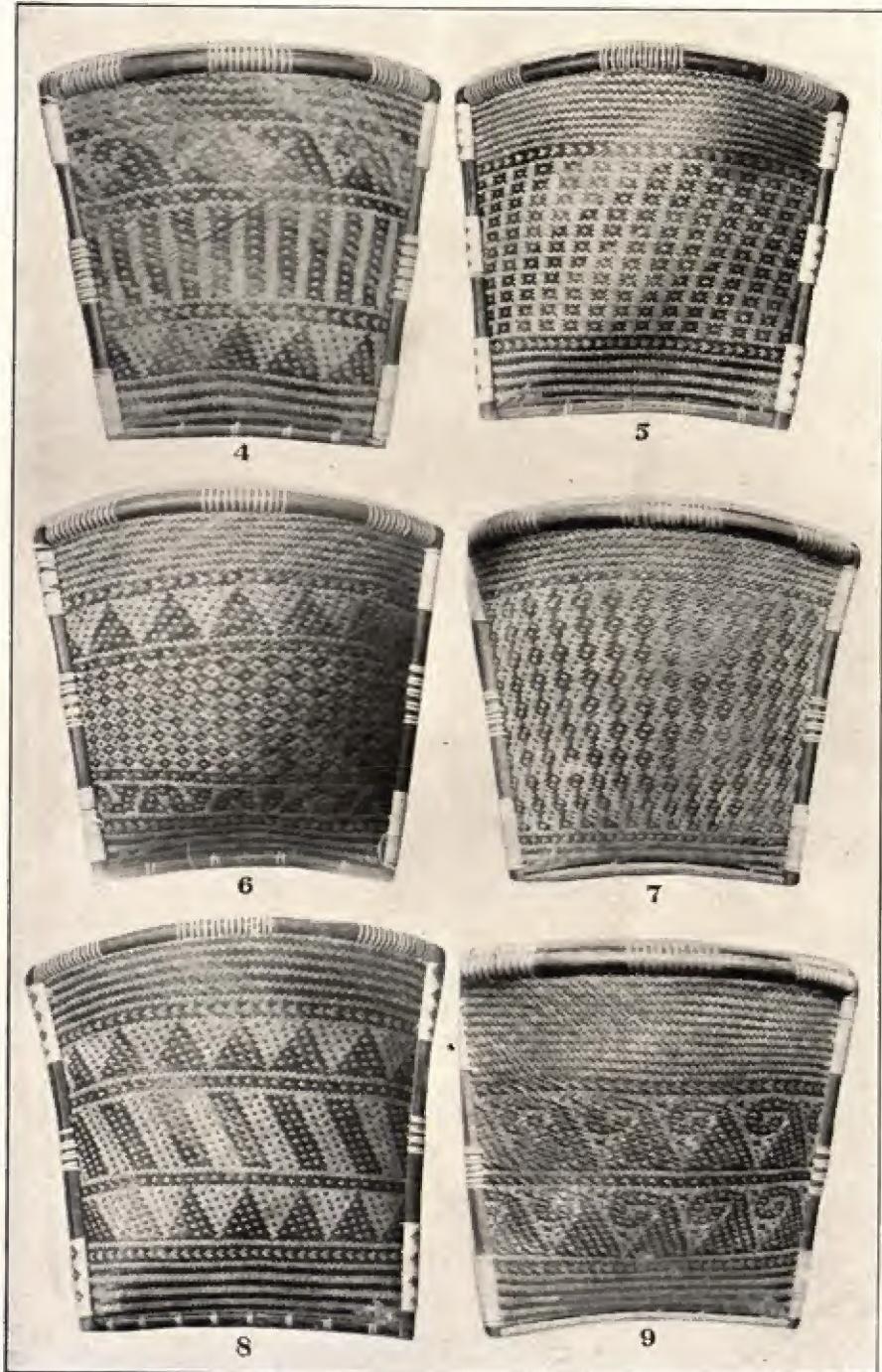
Further information about this coin would be very welcome. Are any other specimens known?

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Swayne: Baskets from Sarawak.

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Swayne: Baskets from Sarawak.

REJANG BASKETS FROM SARAWAK.

By J. C. SWAYNE.

(Plates VI—X).

The Rejang basket, (*bakan* or *tepoko*) has been exported for many years and is well-known outside Sarawak. It is made by two Kelamantan tribes in the Rejang River, the Seduaans and the Kenauits.¹ It is the usual type of household basket made by all the Kelamantan tribes, but so standardised that the name is given only to those made by these two peoples.

The material used for the bottom-work and sides is *Sitah* (Malay *bemban*), for the rims and supports *rotan tiram*, for the fine wrapping *rotan sega*. Usually a portion of the wefts are dyed red and black. The red dye, dragon's blood (*jernang*), is obtained from the fruit of a rotan,² while the black is usually tar bought from Chinese traders.³

The collection of material is done by men and the remaining work is entirely in the hands of women. As a rule sufficient material is prepared at one time to last several months.

The *bemban* is first picked over and the outside green skin is scraped away with the back of a knife, it is then cut into rods of the same length and graded into bundles of the same thickness. These are soaked in water for three days and when dried (*ngurek*) are split with a knife (*isok aiang*) ready for dying. This is usually done near the cooking fire (the dyes are applied hot) by rubbing a cloth soaked in the melted dye on the outside skin until a smooth surface is obtained. Only half of each rod is treated so one half of the finished weft is red or black and the other a light green which bleaches later to an ivory colour. The rods are next quartered (*garai*) and then divided into eighths when they are ready to have the pith removed. This is done in four separate operations (a) *Asid*. Most of pith is cut away by running the material over the sharp edge of a knife (*isok unit*). The knife and one end of the *bemban* is held in the right hand and the free end in the left. (b) *Tuep*, the second scraping, the blade of the knife is notched slightly into the skin and most of the remaining fibres is removed. (c) *Mamoh* (pith), any remaining fibres are pulled off with the teeth. (d) *Trak*, a knife blade

¹ Formerly the Tanjongs and Banyoks in the same river made similar baskets: they have now been absorbed by their neighbours.

² Some of the earliest material collected for the Sarawak Museum is a set of Kenauit baskets (Cat. No. 1) Red dye only is used.

³ Formerly a dye was made from the leaves of certain trees (e.g. buah Sibu), from the roots of various plants (e.g. kladi), or even from the soot of dammar which was burnt in torches before the introduction of kerosine oil and other illuminants.

is run at right angles over the weft. These are now tied in bundles and used as required.⁴

The *rotan sega* is scraped in a somewhat similar manner and in addition is drawn through a guage consisting of two knife blades set close together in a block of wood which ensures a uniform width. These blocks (*kapak*), which are kept steady by a long wooden support on which the operator rests his knees are sometimes carved.

Weaving is started from the bottom upwards by placing eight⁵ *bemban* wefts in a two over one oblique twill, others are added to these till the bottom is finished. It should be noted that the Seduaan worker has distinguishing names for the upper (*matup*) and lower weft (*irah*). As a rule the Seduaan picks up the *matup* with her right hand and places the *irah* with her left, the Kenauit does the reverse, in this way the bands of colour run in opposite directions due to this difference in weaving. However the Seduaans appear to use both methods, but not, I believe, the Kenauits.

For convenience a worker has a small table (*asoh*) on which to rest her work. (Fig. 1). When a few inches of the sides are finished, the rest of the weaving is done on a mould. This consists of an old rotan basket (*sungan*) strengthened inside by a roll of unsplit rotan. When the sides, which are kept level all the way round, are about half finished sixteen pieces of split bamboo (*pasang*) are inserted between the mould and the unfinished basket and outside these four pieces of the spathe of a sago palm (*gong*) are thrust; this gives a smooth surface on which to work (Fig. 2). As the sides become higher the wefts are spaced more widely apart, so that the top of the basket is larger than the bottom, but so well is this done that very little difference in the weave is noticeable. In some patterns or when wefts are broken a few may be added, this is done during the weaving (Fig. 3). The loops are cut and the free ends are drawn under the stroke above by a slight pull and it is impossible to see where the addition has been made.

When the sides are done the basket is taken off the mould. It is usual to complete the weaving of a number and then finish them together. The first operation is to bend back each weft and pass it under the two top strokes, but before this is done two sticks (*pasang*) are placed at right angles inside the basket, in order that it may keep its shape. The free ends of the wefts are cut off flush and an outer and inner hoop of split rotan are put in position to form the rim, four uprights are then placed

⁴ It should be noted that at each stage of treatment imperfect pieces are discarded, if they are sufficiently long they are kept for use in making smaller baskets.

⁵ More rarely an odd number is chosen.

An average size of a basket is—

Diameter at bottom 8 inches.

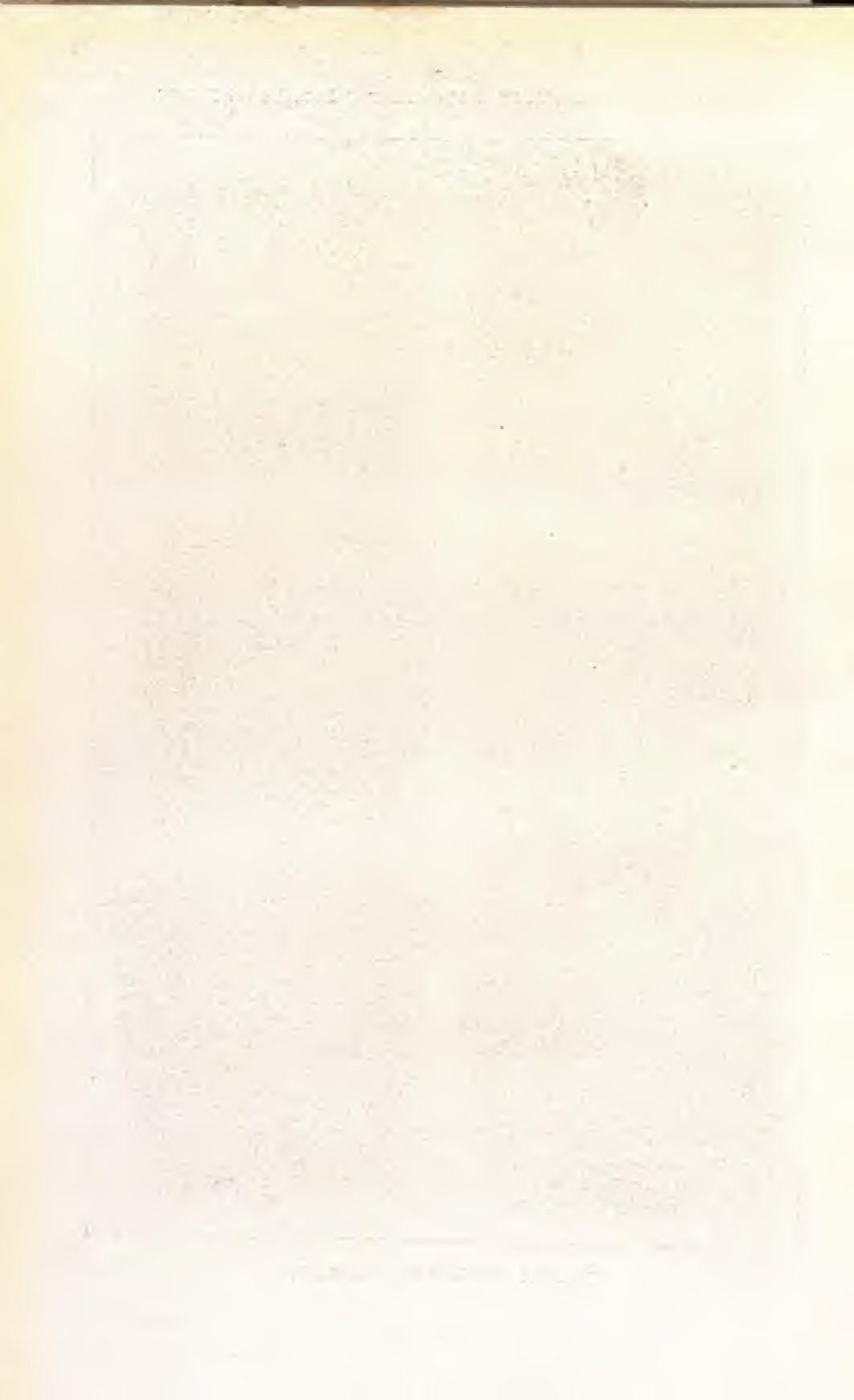
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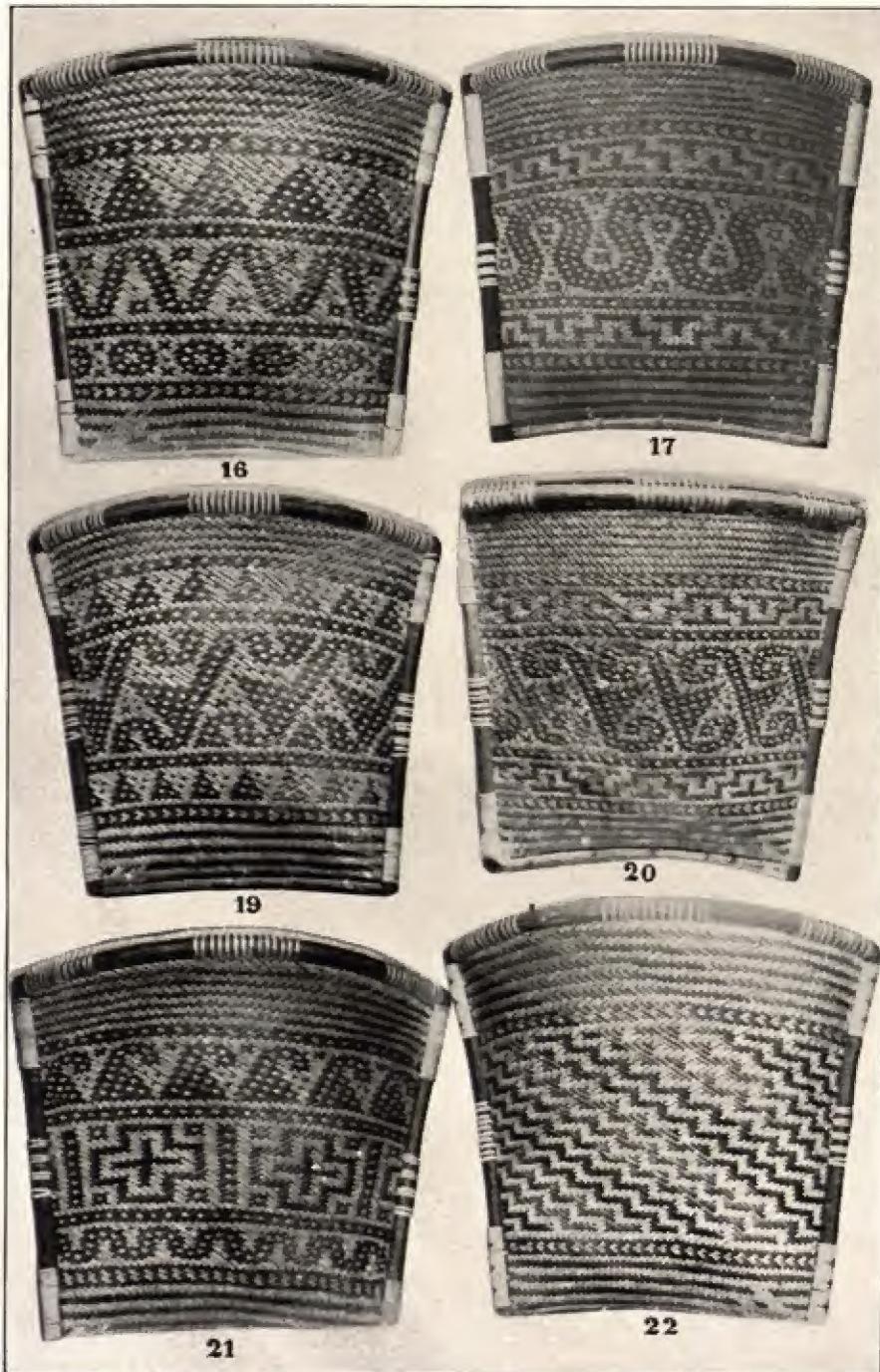
Height 8 "

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Swayne: Baskets from Sarawak.





Swayne: Baskets from Sarawak.



at equal distances apart and are kerfed where they pass over the rim. They are sewn on to the sides of the basket by a thin weft of *rotan sega*. Four separate pieces are also sewn to the sides of the bottom. A very narrow hoop of rotan is now placed above the rim (to conceal the finish) and retained there by a series of figures of eight between intervals of wrapped work. It will be noted that the lower loop of the eight passes over both parts of the rim and through the sides of the basket. Only the most carefully selected rotan is used for the finish and great care is taken to keep the wrapped and sewn work regular. The final act is to trim the feet of the basket so that it may stand level. It is now ready for use.

As may be seen, all Rejang baskets are decorated by patterns which generally consists of an isolated geometric figure. Dr. Otis Mason,⁶ in discussing Malayan basketry, suggests that time has obliterated all symbolism which has existed in the various patterns found on most forms of basketry in these parts; but this is not so as Mr. Woolley's⁷ article published in a recent number of this journal, will show.

It is true however, that very little has been published on this subject, and therefore it seems desirable to put on record any information still obtainable.

On each basket there is a variable number of patterns each having a distinct meaning. As a rule one pattern predominates on each basket and the smaller ones above and below can be regarded as subsidiary.

The following is a complete catalogue of the names of the patterns on Fig. 4 from top to bottom.

- A. *Benaro dua*. A band of twilled twos. *Benaro* is the name of a grass which is often used to tie up bundles.
- B. A single line forming a border between A. & C. *Ningir Kli*=the feeler of a mud-fish.
- C. *Blaut*—(1) a fish, or (2) one of the inferior members of the spirit world.
- D. A single line, as B.
- E. The main pattern *NINGIR KLI* same as B. & D.
- F. Single line *sait segaan*=a rotan fishing hook.
- G. *Robong*=a bamboo sprout.
- H. Eight lines *Benaro telau*. Twilled threes, *benaro* as in A.

To save repetition only the names of the principal pattern of each basket illustrated are given, except in those cases where the subsidiary pattern also occurs as a principal in baskets not shown.

⁶ Vocabulary of Malaysian Basketry. Pro. U. S. Nat. Museum, Vol. XXV, No. 1631, p. 40.

⁷ M.B.R.A.S. Vol. VII, p. 291.

- Fig. 5. KUTAU MANOK=a bird tick (or mata punai=pigeon's eye).
- " 6. (c) Rebong—a bamboo shoot..... .
 - (e) TRUTOH UJAN=rain drops.
 - (g) Lengah getu="ear" on earthen-ware jar.
 - " 7. TERMESEH=magpie-robin.
 - " 8. ANYAM KLANG=a mixed pattern.
A variation of this, when the coloured bands are broader and four white strokes appear, is known as *niarang alo*=rib-bones.
 - " 9. MABAT=a cloud.
 - " 10. Sabulu=a bamboo.
 - " 11. C. Lengah kenam=broken "ear" of an earthen jar
E. BUNUT (or plajau)=names of unidentified jungle fruit.
H. benaro dayak=dayak twill.
 - " 12. BUNUT OKING=fruit with hooks.
 - " 13. BUNUT PENAGAR=fruit fenced in.
 - " 14. SPAD=(a) a fish of that name or (b) to cut.
 - " 15. IKUI DIMONG=tiger-cat's tails.
 - " 16. GRAAM=chin.
 - " 17. C. Ulu phah=paddle handles.
E. DEPANG=a forked stick used for gathering fruit.
 - " 18. BIJIEK (buah ijieh)=hawk-bells.⁹
 - " 19. SENABIT SUSUN=(a) an edible fern or (b) hooks on a line.
 - " 20. SENABIT LENGAH LENGAHAM—an edible fern.
 - " 21. LELAIAK=(a) fish of that name or (b) plaited leaf ornament used in a witch-doctoring ceremony.
 - " 22. SIKU SELUANG=fin of a *seluang* fish.
 - " 23. SULAK=eddy on a river.
ASU^{*}=a dog (this pattern may be seen in the unfinished basket on Fig. 3).
 - " 24. UHONG=(a) horn of wild cattle (b) or name of jungle fruit. This pattern is more commonly found on mats. The basket is from Kenauit.
 - " 25. C. Robong susun=bamboo shoots in layers.
E. DUKUN=name of one of the inferior class of spirits.

^{*} This is one of three patterns which it is taboo (*mali*) to make. It is thought that anyone making them is in danger of going blind, though old persons and, formerly, slaves could make them without risk. The other two forbidden patterns are *gajah* (elephant) and *boiah* (crocodile).

⁹ This photograph was unfortunately received too late for publication.—ED.



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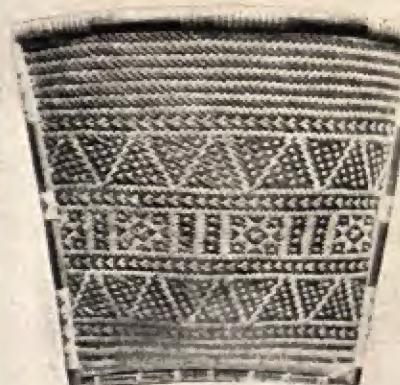
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Swayne: Baskets from Sarawak.

- Fig. 26. KLIDIENG=a pillar tomb.
,, 27. C. robong bersabong=bamboo shoots dovetailed.
E. PEDADA=flower of pedada.
,, 28. SULAU=toggle of belt of parang.
,, 29. BETAAN=weft used in basket making.

Two baskets (not illustrated) which belong to this class are known as (a) KANALEH-twisted, the pattern consisting of large cheques of black and white, the basket is often made entirely of rotan, (b) SALAD TIMON, the meaning of which is unexplained, though it definitely does not mean a cucumber salad; it is made of very fine uncoloured *bemban* wefts and generally figures as one of the baskets holding part of the dowry in a Melanau wedding.

Most of the baskets illustrated are now in the Cambridge Museum of Ethnology.

Before leaving the subject it is not uninteresting to note the similarity of appearance both in weave and patterns of baskets made in British Guiana, and in Louisiana, the latter by the Chetamacki Indians.

SKELETAL REMAINS FROM THE KUALA SELINSING EXCAVATIONS, PERAK, MALAY PENINSULA.

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The remains were sent to me by Mr. I. H. N. Evans, Ethnographer, Perak Museum, classified in three groups, Association 1, 2, and 3, which terms I have used to indicate the groups throughout.

1. DESCRIPTION OF MATERIAL.

The Association 1 remains consist of a large number of fragments of vertebrae among which can be recognised the second, third, fourth and fifth lumbar vertebrae, the last three and three from the upper series of thoracic vertebrae, the axis and the fifth and sixth cervical vertebrae. The remainder are mere fragments which cannot be placed. The bony structure is not mineralised and the bones are light and very fragile, the cancellous tissue showing a somewhat open network. There is some lipping of the margins of the bodies of the last two lumbar vertebrae indicating a degree of chronic spondylitis. All that remains of the sacrum is the left upper fragment including a part of the first sacral body, one articular process and a portion of the auricular surface. There are four recognisable fragments of the left innominate bone one portion carrying the auricular surface. The second fragment is a portion of the ala of the ileum carrying the anterior superior and inferior spines and a part of the acetabulum. The third part consists of the body of the ischium bearing the portion of the acetabulum down to the acetabular notch. The fourth part constitutes the greater part of the crest of the ileum. There are two fragments of the right innominate bone, a larger carrying the upper portion of the acetabulum, the anterior superior and inferior iliac spines, a portion of the ala and part of the auricular surface. The smaller fragment consists of the body of the ischium with the corresponding portion of the acetabulum and the ischial tuberosity. Unfortunately the descending ramus and body of the pubis and the ascending ramus of the ischium are missing on both sides. Had these been present the sexing of the remains would have been a comparatively easy matter, but the evidence is in favour of the male sex.

The left femur is complete except for the great trochanter, the posterior part of the medial condyle and the posterior and lateral parts of the lateral condyle which, however, are present as two separate fragments. Six fragments of the right femur are present. The largest includes the upper two-thirds of the shaft with the great trochanter complete. The lesser trochanter is broken off. The head is present as a separate segment, there are two fragments of the lower end of the shaft which is still incomplete and a portion, incomplete, of the lower epiphysis in two fragments. The right patella is present and shows no sign of disease. The left tibia has its lower end missing and the right tibia is represented

only by a portion of the shaft, part of the upper epiphysis and two small fragments of the lower end of the shaft. The only bone of the foot present is the right cuboid.

Of the upper extremity the right clavicle is practically complete except for a small portion of the acromial end. The left clavicle is minus the sternal end and also a small part of the acromial end. The scapulae have fared very badly. There is only one recognisable fragment of the right clavicle carrying the spine with acromion process and a portion of the body and the complete glenoid cavity. On the left side there are two fragments, one carrying the spine and acromion process and the other the glenoid cavity. The right humerus is perfectly preserved, the left is without a head and tuberosities. There are no recognisable parts of the right radius or ulna but the left radius is practically complete a small fragment consisting of the lower epiphysis having been broken off but articulating perfectly. The left ulna is represented only by the upper part of the shaft including the coronoid process but without the olecranon. There is also a second left and right metacarpal, two proximal phalanges and one middle phalynx.

There is a number of fragments of ribs including the posterior half of the left first rib.

The skull had been very badly crushed and was represented by a large number of fragments. The line of the various fractures and the markings on the bone, however, enabled us to reconstruct the fragments from which we have obtained a complete vault except the posterior margin of the foramen magnum and jugular processes of the occipital. The sphenoid is almost entirely missing except for the part carrying the root of the pterygoid processes. The ethmoid and nasal septum are also absent as is also a portion of the palate. We have been able to complete the orbital margin on the left side but on the right side the lateral and inferior part is missing. The walls of the orbits are almost completely missing as are also both nasal bones. The mandible is in three fragments, the fracture running obliquely through the body on the left side. The right angle of the mandible is present as a separate fragment. Of the teeth there are the first, second and third upper molars and bicuspids on both sides. The upper canines and incisors are absent. In the mandible the bicuspids are present on both sides, the three molars and canine on the right side and the first molar on the left side. The crowns of the teeth show a remarkable degree of wear on the occlusal surfaces. The occlusion is excellent and the teeth are well spaced, delicately formed and by no means massive, the roots are slender not unduly long with no sign of taurodontism. There is evidence of a mild chronic pyorrhoea with secondary overgrowth of cementum between the roots of the molar teeth. On the occlusal surfaces the enamel is completely worn down and the dentine is exposed and ground smooth with no sign of caries or cavitation. It is difficult to account for the degree

of wear present. Either the food eaten must have been very resistant or it contained some substance which caused a slow decalcification and softening of the enamel. I have recently seen the same condition in a modern hylam Chinese skull. I have made extensive enquiries but could find nothing in the normal diet of the latter which could account for the wear by mechanical means.

In the Assoc. 2 group there are the remains of three lumbar vertebrae, probably the second, third and fourth for the fifth lumbar vertebra is fused by its transverse processes to the alae of the sacrum constituting a full degree of sacralisation. There is a fourth or fifth cervical vertebra and some fragments of dorsal vertebrae. The lumbar vertebrae show marked signs of spondylitis. The sacrum is represented by the first piece practically complete and a very small part of the second piece carrying the auricular surfaces. The right innominate bone is in two pieces, one carrying the ischial and iliac portions of the acetabulum and the ischial tuberosity and the other bearing the auricular surface and the great sciatic notch. The left innominate bone has only one recognisable fragment carrying the anterior superior and inferior iliac spines, iliac and ischial parts of the acetabulum, the auricular surface and the great sciatic notch. The ischial tuberosity is missing as are the bodies and rami of the pubic bones and the ascending ramus of the ischium.

The left femur is almost complete in three fragments a small portion of the internal condyle being missing. The right femur is complete in two fragments except that the posterior part of the great trochanter is broken off. The left tibia is intact and the right is complete in two fragments. Portions of the shaft of both fibulae are present but not enough to build a complete bone. The tarsals and metatarsals of the right foot are complete and have been articulated. On the left side all the tarsal bones are present and the first and third metatarsals and several phalanges. Both clavicles are deficient and all that remains of the right scapula is the body carrying the glenoid cavity, the spine and acromion process in two pieces. Only the body carrying the glenoid cavity of the left scapula is present.

Unfortunately neither of the humeri is complete, the head and tuberosities of the right being missing while only the lower half of the shaft and medial half of the trochlear process are present on the left side. The left radius is complete in two fragments but only the middle half of the shaft of the right is present. The coronoid process and upper two-thirds of the shaft of the right ulna is present also the corresponding part of the left ulna with the olecranon available as a separate fragment. Of the bones of the hand only the right semilunar is present and also some fragments of metacarpals and phalanges. Only the right first rib is complete a few small fragments representing the remainder.

In this case also the skull is very badly broken and represented by a number of fragments. We have been able to place all the

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fig. 1.



fig. 2.

Harrower: Skeletal Remains from Perak.

available parts the result being a fairly complete reconstruction. The vault of the skull is complete except for the region round the pterion on both sides and the posterior part of the foramen magnum. The whole of the base is missing as is also the ethmoid, sphenoid, nasal septum, nasal bones and posterior part of the palate. The frontal processes of the maxillae are both present as separate fragments but the adjacent parts of the maxillae are absent. The mandible is complete except for the right coronoid process. As regards the teeth the upper three molars are present on both sides. There is a good deal of secondary cementum around the roots of the molar teeth indicating a chronic periodontitis. The upper bicuspids and canine are present on the right side but only the second bicuspid on the left side. In the mandible the second and third molars are present on both sides. There is a marked erosion of bone on the buccal aspect of the alveolus of both lower first molar sockets indicating pyorrhoea complicated by alveolar abscess. The degree of wear on the occlusal surfaces is even more remarkable than on the Assoc. 1 skull. The whole of the enamel is completely worn down and the upper canine is worn flat so that its occlusal surface is horizontal. The occlusion is somewhat irregular. The crowns of the upper molar and bicuspid teeth are directed obliquely medially. In consequence the buccal surfaces of the mandibular teeth instead of being overlapped by the buccal margin of the maxillary teeth have the bucco-occlusal border raised into a sharp ridge due to wear, this ridge overlapping the buccal margins of the maxillary teeth.

The Assoc. 3 remains are somewhat scanty and consist of a right femur complete and in good preservation, the upper two-thirds of the shaft with the head and tuberosities of the right humerus and a complete right radius. There is one dorsal vertebra probably about the fourth or fifth, some fragments of ribs and a complete left first rib and a small portion of the spine of a scapula. The left zygomatic bone and a large fragment of the right innominate which includes a part of the ala of the ileum with the anterior inferior spine and a part of the auricular surface, the complete acetabulum and the ischial tuberosity.

There is a fragment of the lower jaw, the left half being complete and carrying two molar teeth the third molar not having erupted. The alveolar arch is present on the right lingual side as far round as the first molar socket. On the labial side the arch is missing from the canine owing to the obliquity of the line of fracture.

There is also a complete cranium the entire facial portion being missing. The cranium was found on the surface separate from the other bones and the weathering of the cranium is quite different to that of the remainder of the bones. A considerable number of tough roots were entwined through the fissures and foramina.

2. A COMPARISON OF THE ANTHROPOMETRIC VALUES
OF THE REMAINS.

(A) Assoc. 1. Remains.

On a superficial inspection of the bones one gets the impression that the remains are female. The small pelvic bones the shortness of the long bones and the small skull all contribute to this impression. Unfortunately neither the sacrum, which by its curvature, nor the public segment of the nominate bone whose subpubic angle would have given us a definite clue to the sex, are present. A closer examination of the long bones shows that for their length they are unusually robust and the muscular attachments are particularly well defined. The small piece of the sacrum available shows the auricular surface down to the second piece and probably extending beyond it, which is broad and somewhat heart shaped in contradistinction to the more semilunar outline commonly seen in the female. The innominate bone shows a pre-auricular sulcus but not more marked than is frequently found in the male. There is no eversion of the ischial tuberosities and I have tried to estimate the carrying angle of the humerus which is consistent with the male skeleton. The clavicles, too, are very massive for the general dimensions of the bones. The skull offers no definite evidence of sex although the thickness of the bones and the well defined markings all favour the opinion that the individual was of the male sex. I frankly admit that it has been a very difficult matter to determine the sex, but after prolonged examination and comparison I am convinced that the sex was male.

As regards age one can definitely say that the remains are adult. The wisdom teeth are fully erupted and have been functioning for a very considerable time as is evidenced by the degree of wear on the occlusal surfaces. The sutures are still well marked the saggital, coronal and lambdoidal sutures showing no signs of ossification. Thus one can confidently estimate the age at about 35 years.

Although the skull was badly broken we have been able to utilise all the pieces in reconstruction. We were fortunate in having a complete mandible after reconstruction, as the mandible is of the greatest value in orienting the facial and temporal bones which form the keystones to the arch of the skull. The reconstructed skull is of small size and even a superficial observer cannot fail to note that it lacks those characters which are so typical of the mongoloid skull and are present in the Malay.* The norma

* This term is here used in the restricted sense to define the peoples, including the inhabitants of Malaya and the Dutch East Indies, recognised as Malays proper. They profess the Muhammadan religion, are Mongoloid in character, and for the purposes of the present work are to be considered quite apart from the Semang, Sakai, Dyaks, Balinese and other inhabitants of these lands.

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fig. 3.



fig. 4.

Harrower: Skeletal Remains from Perak.

frontalis (Plate 1) shows the face to be somewhat square in type. The cheek bones are prominent but there is no undue projection of the zygomatic arches. The orbits have a rectangular appearance which does not compare with the oblique rounded cavity of the mongol. Perhaps the most obvious feature is the great breadth of the nasal cavity and the flattening of the frontal process of the maxilla. The anterior surfaces of these processes are directed forward and only slightly laterally instead of forwards and definitely outwards as in most races. This indicates that the nose must have been remarkably broad and almost certainly flat and of the negroid type. The superciliary arches are but slightly developed.

In norma lateralis the skull is seen to be long and low. (Fig. 2). The forehead is low and sloping so that the vault has a distinctly flattened appearance. The face gives the impression of orthognathism but there is a slight degree of subnasal prognathism not nearly so pronounced, however, as one usually finds in the Mongol. A very obvious feature is the breadth of the ramus of the mandible at the level of the mandibular notch and the shallowness of the notch itself. These are recognised as primitive features. The mental eminence is well developed showing the possession of a chin. The mental tubercle has the usual four impressions and there is no sign of any simian ledge.

The norma verticalis (Fig. 3) shows an ovoid outline with a well developed frontal breadth and without undue parietal bulging which is such a common feature in many mongolian skulls. In norma occipitalis (Fig. 4) the skull has a distinctly low-set square appearance, the sides instead of sloping downwards and inwards towards the mastoid portions are parallel so that the skull has a wide base. The occipital bone too, is large, well-rounded and fully fashioned.

As a matter of interest and for purposes of comparison, I have photographed this skull in norma frontalis alongside a female Malay skull of approximately similar size. The differences are so obvious that comment is unnecessary. (Fig. 9).

The question naturally arises, if the remains do not conform to Malay standards, what manner of man was this? For enlightenment we must turn to the various measurements of the skull for comparison with the values in other known races. In this I have been fortunate in having measurements for most of the adjacent races available, and of particular value is the paper by Schebesta and Lebzelter entitled 'Schädel und Skelettreste von drei Semang Individuen.' In Table 1. I have included the linear measurements of the skulls of Assoc. 1, 2 and 3 remains for comparison with male and female Malay, Semang, Dyak, Tamil, Java Bantams, Javanese, Fukien and Burmese skulls.

TABLE I.
LINEAR MEASUREMENTS.

	Malay ♂	Malay ♀	Semang (Menri.)	Assoc. 1.	Assoc. 2.	Assoc. 3.	Dyak.	Tamil.	Java. Bant.	Fukien.	Burmese or A."
L.	178.0	168.0	175.0	176.0	190.0	181.0	176.6	179.6	169.9	173.7	179.9
B.	148.5	136.5	135.5	142.5	145.0	138.9	131.5	148.0	142.9	140.9	143.5
B ₁ .	95.0	96.6	96.0	94.0	89.0	95.5	93.3	95.17	90.8	93.1	94.3
H.	138.2	136.8	131.0	126.0	—	136.0	134.8	136.28	134.4	135.5	137.8
L.B.	99.0	99.5	98.0	98.0	—	97.0	99.4	101.5	97.2	99.3	98.5
G ₁ .	95.5	94.0	97.0	100.0	—	—	95.6	96.4	97.5	96.04	96.6
ON.	137.0	131.0	129.0	—	—	127.5	—	—	—	—	—
GH.	66.5†	69.8	64.0	67.0	84.0	—	69.7	64.8	69.8	70.9	73.8
GB.	99.0	99.4	—	96.0†	102.0†	—	100.8	97.5	98.2	101.1	99.3
J.	126.9	132.0*	129.0	122.0	133.0†	—	132.9	127.8	132.0	134.7	132.6
NH.	51.0	52.0	45.0	50.0	64.0	—	50.2	49.4	49.3	50.6	52.6
NB.	28.4	27.5	26.0	33.0	—	—	27.2	24.0	26.3	26.8	25.2
O.R.	37.0	41.8	—	—	37.0	—	39.8	—	39.2	38.7	39.6
O ₁ .R.	37.0	40.2	39.0	40.0	37.0	—	39.4	—	38.5	38.7	35.5
O ₂ .R.	35.0	35.2	—	—	—	—	33.5	—	33.6	34.1	34.6
O ₂ L.	35.0	35.8	33.0	32.5	30.0	—	33.7	—	33.8	34.2	35.0
G ₁ .	48.5	47.0	—	—	—	—	49.5	50.2	50.7	50.1	49.8
G ₂ .	42.5	39.0	—	36.5	47.5	—	40.6	38.8	40.3	41.0	39.6
fml.	38.0	34.5	—	—	—	32.0	36.1	36.7	35.7	35.4	36.7
Imb.	30.5	31.5	—	—	—	26.0	30.2	29.5	29.2	29.6	30.7
U.	517.5	484.0	—	504.0	525.0	512.0	500.6	498.0	491.8	501.0	510.5
Q.	338.0	316.0	—	290.0	313.0	339.0	312.6	313.2	313.9	318.4	322.0
S ₁ .	128.0	129.0	116.0	114.0	127.0	132.0	125.0	128.8	123.8	125.2	129.0
S ₂ .	131.0	111.0	112.0	124.0	123.0	126.0	124.2	131.9	119.5	123.7	124.0
S ₃ .	114.0	110.0	120.0	117.0	—	128.0	114.0	106.8	109.8	111.4	117.0
S.	373.0	350.0	348.0	355.0	—	386.0	365.0	367.6	353.3	360.4	363.7

† = Bone damaged and approximation made.

* = Probably abnormal owing to a double undreduced dislocation of the mandible.

‡ = Approximation by measuring one half and doubling.

- L = maximum length from glabella to occiput in the median plane.
- B = maximum breadth on parietal bones.
- B¹ = minimum frontal breadth between temporal crests.
- H² = basi-bregmatic height.
- LB = basi-nasal length.
- ON = opistho-nasal length.
- GL = basi-alveolar length.
- G'H = height from nasion to prosthion.
- GB = face breadth between lowest points of zygomatic-maxillary sutures.
- J = maximum breadth between zygomatic arches.
- NH = nasal height between ant. nasal spine and nasion.
- NB = nasal breadth between widest parts of pyriform aperture.
- O¹ = greatest breadth of orbit from dacryon at right angles to height.
- O² = greatest height of orbit taken in a vertical plane.
- G¹ = length of palate from tip of post nasal spine to a line joining the inner aspects of medial incisors.
- G² = palatal breadth between inner aspects of second molars.
- fml = length of foramen magnum.
- fmb = breadth of foramen magnum.
- U = Flower's horizontal circumference.
- Q = transverse arc through apex vertical to horizontal plane, ending at the upper margins of the external auditory meatuses.
- S¹ = arc from nasion to bregma.
- S² = arc from bregma to lambda.
- S³ = arc from lambda to opisthion.
- S = sagittal arc from nasion to opisthion.

Taking the maximum length we find that the Assoc. I skull at 176 compares with the Semang at 175, the Dyak at 176.6 and the male Malay at 178. The maximum parietal breadth measurement at 135.5 can only be compared with the Semang at 136, the female Malay at 136.5 or the Dyak at 138.2. The minimum frontal breadth is 94 and in the Dyak 93.3, male Malay 95, Tamil 95.17 and Semang 96. The male Malay, however has a parietal

breadth of 148.5 which is 13 mms. greater than the Assoc. 1 skull, so that the outline of the skull in *norma verticalis* is entirely different. As one would expect from the low vault, the basal height of the skull is very low at 126 the nearest approach to it being the Semang skull at 131. The basi-nasal length at 98 equals that of the Semang, the male Malay giving a value at 99 and the Dyak at 99.4. Of all the measurements made on skulls perhaps the most remarkable feature is the small degree of variation in the basi-nasal length in the skulls of all races. In the measurements quoted it will be seen that the maximum difference in this value is 2.3 mms. This, of course, is hardly a fair comparison, as in some cases we are dealing with the measurements on a single skull while in others, with the means of a large series. The variation in individual skulls will be greater. As a matter of interest if we take the means of the measurements for modern Negroes, White-chapel English, Tamils, West Scottish, Altbayerish German, French, Prehistoric Egyptians and the Assoc. 1 skull, these are respectively, 102.96, 101.6, 101.5, 100.37, 100.3, 99.7, 99.34 and 98 which is a somewhat remarkable approximation especially when we remember that the capacity of the German skull is 1500 ccs. compared with the estimated capacity of the Assoc. 1 skull at 1240 ccs. or the measured capacity of the Semang at 1270. The value of the basi-nasal length is thus extremely constant for all human races.

If we now consider the length from basion to alveolar point, we find that the Assoc. 1 value is 100 compared with the Semang at 97 and the Dyak mean at 95.6. The male Malay is low at 95.5 and the female Malay still less at 94 although the mean for Javanese skulls is given by von Bonin as 97.5. The capacity, owing to the deficiencies in the skull, can only be estimated. There are many formulae for such estimations with special correction factors for different races. I have used Manouvrier's formula.

$$C = \frac{L \times B \times \text{Basal Height}}{2 \times 1.135}$$

I am aware that this value may be out to the extent of 4% but the value obtained at 1236.5 ccms. compares very favourably with the capacity of Schebesta's Semang by direct measurement at 1270 ccms. when we consider the equality of sizes. The skull is thus well down in the microcephalic group.

The indices also offer a most useful means of comparison. The Assoc. 1 skull gives a cephalic index of 76.98 which places it in the lower mesaticephalic group. This is in marked contrast to the male and female Malayan skull, the Javanese and Javanese Bantam skulls which are all brachycephalic with an index of over 80. The nearest approach to the Assoc. 1 skull is the Semang skull at 77.7 and the Dyak mean at 78.4.

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fig. 5.



fig. 6.

Harrower: Skeletal Remains from Perak.

TABLE 2.
CRANIAL INDICES.

	Malay ♂	Malay ♀	Semang (Menri.)	Assoc. 1.	Assoc. 2.	Assoc. 3.	Dyak.	Tamil.	Java- Bant.	Javan.	Fukien.	Burmese "A."
100 B/L ..	83.42	81.25	77.7	76.98	75.00	80.11	78.4	73.45	83.0	82.0	78.75	82.9
100 H/L ..	77.64	81.43	74.86	71.69	—	76.13	76.5	76.21	79.2	78.1	77.02	78.4
100 G1/LB ..	103.06	105.85	98.98	102.04	—	—	96.19	94.55	99.17	98.19	97.01	98.12
100 O ₂ /O ₁ L ..	94.59	89.05	84.62	81.25	81.1	—	85.53	81.65	87.82	88.37	91.04	—
100 O ₂ /O ₁ R ..	94.59	86.60	—	—	—	—	84.7	—	85.70	85.9	89.35	88.4
100 NB/NH ..	55.68	52.89	57.78	66.0	—	—	54.5	51.64	53.5	53.1	48.15	52.8
100 G1H/GB ..	67.17	70.22	—	69.78	82.35	—	69.2	66.72	71.0	70.2	73.8	69.8
100 G1H/J ..	52.77	62.89	49.61	54.92	63.16	—	—	50.7	—	—	65.67	53.28
100 B/H ..	107.54	98.46	103.81	104.23	—	106.01	102.9	96.14	104.9	105.1	102.27	105.7
100 Imb/imb ..	89.03	91.30	—	—	—	81.25	83.8	80.17	82.1	83.9	82.98	83.8

The height index at 71.69 places the skull in the metriocephalic group. All others with the exception of the Semang at 74.86 are in the hypsicephalic group with indices of over 75.1, the Dyak mean being the nearest approach at 76.5. If we next consider the gnathic index, we find that the mesognathous group includes from 98 to 103. The Javanese mean is given as 98.19 but the male Malay shows an index of 103.66 and the female 105.85, both distinctly prognathous and in my experience the Malays mostly show a considerable degree of subnasal prognathism. The Assoc. 1 skull at 102.04 although mesognathous shows a higher degree of prognathism than the Semang with an index of 98.98, the Dyaks falling into the orthognathous group at 96.19.

The orbital index at 81.25 for the left side is distinctly low falling well into the microsemic class. To find a comparable index we must fall back on the Australians at 80.9 or the Tamils at 81.65. The Tasmanian index is still lower at 77.8. The nasal index is high at 66. I am prepared to admit that this value is too high, for the margins of the nasal cavities have been rubbed down. The skull, however, undoubtedly belongs to the markedly platyrhine class which completely differentiates it from all other skulls except the Semang which has a high index at 57.78. The Tamils are markedly mesorhine at 51.64 and the Dyaks at 54.5 are in the platyrhine group. The facial index of Kollman gives a value for the Assoc. 1 skull of 69.79 while the Dyak mean is 69.2. This value is not available for the Semang.

The breadth-height index is 104.23 and 103.81 for the Semang. The Dyak mean is 102.9, the Javanese Bantam 104.9 and the Javanese 105.1. The Tamil mean is 96.14. It is obvious that the Tamil skull cannot be compared with the Assoc. 1 skull in this respect.

B. Association 2 Remains.

With regard to the remains of the Assoc. 2 group there is no difficulty in distinguishing the sex. The skull is of large size and the muscular attachments well marked. The long bones too, indicate that the remains are those of an adult male. Further evidence of the male sex is also to be found in the fragments of the innominate bones, which though light in texture are fully curved. The great sciatic notch is narrow even more so than one is accustomed to find in the male pelvis and the pre-auricular groove is scarcely distinguishable. The auricular surface is elongated.

The wisdom teeth have erupted and are well worn down on the occlusal surfaces. The sagittal, coronal and lambdoidal sutures are all open though there is evidence of a commencing closure of the sagittal and coronal sutures. I would accordingly estimate the age of the individual at death as about 40 years.

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fig. 7.



fig. 8.

Harrower: Skeletal Remains from Perak.

The maximum length of 190 mms. is, of course, very large while the breadth at 142.5 mms. gives a cephalic index of 75.0 which just places the skull in the mesaticephalic group. This index is lower than the Dyak mean but it completely rules the skull out of the brachycephalic Malayan type. The orbital index for the left side at 81.1 is for all practical purposes the same as in the Assoc. 1 skull although the measurements are slightly smaller individually. The vertical circumference at 313 is the same as the Dyak mean at 312.6. The horizontal circumference owing to the great length of the skull is 525 compared with the Dyak 500. It will be noted however, that the male Malay approaches it at 517.5.

I have photographed the skull in four normae for comparison with the Assoc. 1 skull. The *norma frontalis* (Fig. 5) shows the square type of face with the prominent cheek bones and the rectangular orbits. The frontal processes of the maxillæ have the same flattened appearance and anterior inclination as in the Assoc. 1 skull. The nasal portions of the maxillæ indicate that the nasal cavity was exceptionally wide, the individual thus possessing the broad flattened nose I have commented on in connection with the Assoc. 1 skull.

In *norma lateralis* we recognise the same low flattened type of vault and the great length of the skull is obvious. (Fig 6). The remains of the zygomatic processes are very slender and the mastoid process is relatively small. The mental eminence is very prominent and the ramus of the mandible demonstrates the shallow mandibular notch and the broadened ramus at the level of the notch.

The *norma verticalis* (Fig. 7) shows the elongated ovoid outline with good frontal breadth in contradistinction to the short ovoid of the brachycephalic skull.

The *norma occipitalis* (Fig. 8) demonstrates the parallel sides from the parietal eminences down to the mastoids a feature which was also noted in the Assoc. 1 skull. The occipital region is fully curved and does not display the characteristic flattening of the Malayan brachycephalic type.

C. Association 3 Remains.

The skull found on the surface near the remains of the Assoc. 3 skeleton is of quite a different type from the Assoc. 1 and 2 skulls and I am convinced is adventitious and does not belong to the other association 3 remains. In this case the vault is high, the maximum breadth is relatively large, the vault slopes up to an angle along the sagittal line. The skull is brachycephalic, and the orbital margins suggest rather the Mongolian type of orbit. This skull

is almost certainly male and the sutures show commencing closure so that it may be assumed that the individual was at least over 30. The fragment of the mandible undoubtedly belongs to the remainder of the skeleton and is similar in type to that of Assoc. 1 and 2 having the same breadth of ramus and shallow mandibular notch. The wisdom tooth has not yet erupted. This in itself is insufficient to set an age to the individual but taken in conjunction with the remaining bones is significant. The fragment of the humerus shows that the epiphysis of the head is not yet completely united to the shaft. The head of the radius is almost completely united to the shaft but the union of the lower epiphysis is still incomplete. The femur shows partial union of the head with the neck but the lower epiphyseal union is not so far advanced. From these facts it can be deduced that the probable age of the individual at death was 16 to 18 years.

The innominate bone shows a remarkably narrow ala of the iliac bone and there is no preauricular sulcus. This narrowing of the iliac ala gives the impression of an immature pelvis which is further strengthened by the fact that the epiphysis of the ischial tuberosity is very incompletely united. In this case there might be a doubt as to whether the individual was in immature female, but in the tropics where maturity is attained at a much earlier age than in colder climates we must accept the evidence as indicative of the male sex. Apart from the skull, however, the remains certainly belong to the same period and people as those of Assoc. 1 and 2.

3. THE VALUES AND INDICES OF THE BONES OF THE EXTREMITIES AND PELVIS.

I have elected to comment on the remaining bones of the three skeletons in a group as they so obviously belong to the same type of people. If we consider first the femora we see that all show a remarkably slender and graceful form of moulding. (Fig. 10). The length of the femur of the Assoc. 1 and 3 remains is approximately equal the Assoc. 1 measuring 400 mms. and the Assoc. 3 measuring 397 mms., although the Assoc. 1 value probably errs on the long side on account of the reconstruction. The femur of Assoc. 2 is considerably longer as one might anticipate from the larger skull. The length is 426 mms. which is 26 mms. longer than the Assoc. 1 femur, yet the latter femur is the more heavily built which further strengthens the belief that the Assoc. 1 remains are of the male sex. One notable feature is the relatively large breadth at the level of the great trochanter and the somewhat considerable development of the trochanter itself. None of the femora show platymerism both the superior and inferior indices being over 80. The shafts have a strong anterior curvature but not more than one finds in modern Asiatic femora.

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fig. 9.



fig. 10.

Harrower: Skeletal Remains from Perak.

TABLE 3.
VALUES AND INDICES OF THE LONG BONES AND INNOMINATE BONES.

		Assoc. 1.		Assoc. 2.		Assoc. 3.		Semang (Mentri)	
		R.	L.	R.	L.	R.	L.	R.	L.
Femur	..	Length Length	400 —	394 357	426 358	397 —	410 345	413 345
Tibia	..	Ant. Post. Br.	..	32	31	29	27	—	—
		Lat. Breadth	..	20	22	22	20	—	—
Humerus	..	100 LB/APB	..	64.5	70.9	75.9	74.1	—	—
		Length	..	278	—	—	—	—	—
Radius	..	Length	..	128	227	—	238	—	202
		Height	..	—	—	—	—	—	237
Clavicle	..	Breadth	..	—	188.5	—	—	—	—
		Length	..	—	—	—	—	—	—
Os. Innom	..	Breadth	..	—	148.0	—	142	—	—
		Length	..	—	—	—	—	—	—
Indices	..	100 B/H	..	—	76.52	—	—	—	—
		100 T/F	..	—	—	83.8	84.6	84.1	83.6
Indices	..	100 R/H	..	81.7	—	—	—	—	78.5
		Stature	..	About 1.56m.	About 1.60m.	About 1.56m.	About 1.57m.	About 1.57m.	About 1.57m.

Note.—The ant. post. and lat. breadths of the tibiae are taken at the level of the nutrient foramen.

The tibiae are only available for measurement in the Assoc. 2 remains. The total length is 357 mms. for the right and 358 mms. for the left. For comparison we have the two tibiae from the Semang skeleton in which the length is 345 on both sides. In addition to these we have the upper end of the left and the upper portion of the shaft of the right tibiae of the Assoc. 1 remains for purposes of study. All show some degree of platycnemism the index for the Assoc. 2 bones being 75.9 for the right and 74.1 for the left tibia and for the Assoc. 1 bones the indices are 70.9 for the left and 62.5 for the right the latter showing a very high degree of the condition. Duckworth quotes the platycnemic index for Skeat's Pangam Semang at 63.6 for the right and 65.5 for the left side. Platycnemism is usually associated with the habitual use of the squatting attitude and is very common among the bones of prehistoric peoples. The head of the tibia, in each case, is rotated backwards on the shaft another characteristic of the squatting habit. Associated with this is the extension of the articular surfaces of the femoral condyles on to the superior surface of the posterior aspect. The politeal line on the tibia is also strongly developed.

Only the right humerus of the Assoc. 1 remains is complete for measuring and gives a total length of 278mms. This is distinctly shorter than the Menri left humerus which measures 302mms. The radius, too, of Assoc. 1 is shorter by 10mms. than that of the Menri skeleton. The upper extremity of the Assoc. 1 skeleton is thus at least 30mms. shorter than the upper extremity of the Menri skeleton (excluding the hand). It seems probable that the lower limbs showed a corresponding difference notwithstanding the fact that the skull measurements are so nearly equal. It will be noted that the Assoc. 3 radius is but 4mms. longer than the Assoc. 1 while there is only 1mm. of difference between the Assoc. 2 and the Menri radius.

The radio-humeral index for the Assoc. 1 remains (if we take the liberty of comparing the left radius with the right humerus) is 81.7 while for the Menri skeleton it is only 78.5. In Skeat's Semang the index is given for the left side as 78.3. This places the Assoc. 1 index in the dolichokerik group which includes the Fuegians, Andamanese and the Simiidae and is a highly primitive feature. With indices between 75 and 80 we find the African pygmies, Oceanic Negroes, and Aboriginal Australians. The European index is under 75.

The tibio-femoral index for Assoc. 2 is 83.8 and 84.6 for right and left limbs respectively. In the Menri skeleton, the corresponding indices are 84.1 and 83.6 respectively. An index over 83 places the bones in the dolichocnemic class, which includes all the more primitive races.

Only the left innominate bone is available for measurement in the Assoc. 1 remains. The index works out at 78.52 which is

not particularly high. The negro index is given by Duckworth as 80.7 and for Bush natives he quotes 83.0. In my opinion this index is of very little value. The European index is said to average 74.5.

I have articulated the bones of the foot of the Assoc. 2 remains. The total length of the skeleton of the foot from the posterior aspect of the os calcis to the anterior end of the first metatarsal is 162mms. This is by no means a low value the average corresponding length in the Chinese being 165mms. The articulations show that the great toe was divergent from the second toe being the usual condition in the bare-footed races.

Stature is always difficult to estimate from the various bones as the proportionate lengths of long bones vary in different races. In the case of the Assoc. 1 and Assoc. 3 remains I estimate the stature at 1.54m. and for Assoc. 2 at 1.60m.

4. REMARKS ON REMAINING FRAGMENTS.

- (1) The portion of the sacrum of the Assoc. 2 remains has the fifth lumbar vertebra fused with it constituting complete osseous sacralisation. The transverse processes of the vertebra are large and massive and have come into contact with corresponding masses rising from the superior aspect of the alae of the sacrum. The margins of the masses have overgrown and fused together by bone deposition. The condition is a prenatal one and has not been acquired. The articulation between the articular processes of the 5th lumbar vertebra and the sacrum has also been synostosed by ossification of the capsule. There is no fusion between the body of the 5th lumbar vertebra and the first piece of the sacrum although the articular disc has been thinner than normal and there is also a curious antero-posterior groove about $\frac{1}{8}$ " deep and $\frac{1}{4}$ " wide on the superior surface of the body of the first piece of the sacrum.
- (2) There are also two lumbar vertebrae belonging to the same remains. These vertebrae show a considerable degree of exostosis round the margin of the articular surface of the body. There is no doubt but that this has been a pathological condition probably a periostitis inducing new bone formation. This condition appears to have been very prevalent among the Semang and probably also in all other peoples who inhabited the Peninsula in former days, for both Duckworth and Schebesta remark on it in connection with the Semang skeletons. It has been suggested to me by Prof. Kay Mouat that this is possibly due to a typhoid spondylitis. It is well-known that a superficial osteomyelitis not accompanied by suppuration develops during convalescence and is

followed by new bone formation and osteophytic outgrowths round the margins of the vertebrae of the lumbar spine particularly.

- (3) Associated with these remains is the centrum of a shark which has been perforated by a hole, through the centre, about 1mm. in diameter. Whether this is an artificial perforation or a natural one the fact that it is the only centrum present suggests that it may have been used as a charm. There are also the upper end of the ulna and the astragalus of a carnivore probably a panther.
- (4) Of the four vertebrae of the lumbar series present in the Assoc. 1 remains, two show the same condition of spondylitis as in the Assoc. 2 bones, although the condition is not so well marked.
- (5) The portion of the right scapula of Assoc. 1 remains carries the spine and acromion process and the glenoid cavity. It is remarkable for the heavily built spine and acromion and the width of the glenoid. Altogether this portion of the scapula is of much heavier structure than that of the corresponding bone of the Assoc. 2 remains. The great scapular notch is relatively smaller than one usually finds on asiatic scapulae.
- (6) The clavicles of Assoc. 1 are very robust and much more strongly marked than the claviculae of Assoc. 2 although the latter skeleton is that of a much taller individual.
- (7) The fragments of the ribs of the Assoc. 1 skeleton are remarkable for their robustness and the well-marked costal groove.
- (8) There is also a portion of the shoulder girdle of a large osseous fish, probably a tapah and the shaft of the femur of a young orang utan and a fragment of a large bone which I am unable to identify.

5. ETHNOLOGICAL CONSIDERATIONS.

If we now make a general survey of the various values compared, one is struck by the marked similarity of the values for Schebesta's Semang (Menri) with the Assoc. 1 skull. In attempting to assess the racial value of this skull, several factors must be borne in mind. In the first place, we must consider the primitive peoples of Malaya, the Semang, who possess many negroid characteristics and the Sakai who are not essentially negroid although many possess negroid characters. Both these races are, however, jungle folk although the Semang sometimes use bamboo rafts for river transport. Their mode of burial is always in jungle fashion, making a nest of twigs in which the corpse is placed, and covered over with twigs and earth. The remains we are considering were

found associated with a canoe burial. This fact introduces a consideration of the folks who may have invaded the country by sea. History relates that sea rovers were extremely rife in early times, and in all probability, these pirates were organised by the Malays and were assisted by the Sea Dyak race. The other great wave of immigration was the great Hindu invasion, evidences of which are plentiful in Java and to a lesser extent in Malaya. Possibly southern Indians of the Dravidian type may have crossed the ocean and settled on Malayan shores.

The craniological evidence places the Assoc. 1 skull as that of a Semang closely allied to Schebesta's Menri skull. In type and form it has many resemblances to the Dyak type skull. It is possible that the skull may be that of a hybrid individual but the evidence of negroid characteristics is unmistakeable and if a hybrid, the Semang element is dominant in both the cranial and the appendicular remains. The Dyaks are of larger stature and cranial capacity while the Assoc. 1 remains are those of an individual of pigny stature. The skull is certainly neither Tamil nor Sakai.

In the case of the Assoc. 2 skull the same general features can be recognised as in the Assoc. 1 skull. The essential difference is in size. There is the same low flattened vault, the square type of face, the prominent cheek bones and a similar type of orbit. The same flattening of the frontal processes of the maxillae and evidence of a broad flattened nose. The wear on the teeth is similar to that of the Assoc. 1 skull which suggests a common mode of life and nutrition. The mandible is of the same type as both the Assoc. 1 and 3 mandibles, with shallow mandibular notch and broadened ramus. Altogether the general appearance of the skull gives one the impression that it is merely a larger edition of the Assoc. 1 type, but the large size rules it out from being a pure Semang. In assessing the racial value of the skull we are very much restricted by the paucity of indices. The evidence is against both the Malayan and the Tamil race. The skull has many characteristics in common with the Dyak type, which according to Keane, is Protomalayan. In my opinion the skull is most probably that of a hybrid, a cross possibly between Semang and Dyak. The resemblance to the Dyaks is most convincing.

The skeletal evidence is not in accord with the cultural findings from the excavations, which appear to be Indian plus Malayan. There are many explanations of how this may have occurred. The skeletal remains are not essentially of the same period as the cultural findings. The burials may belong to an earlier or later period and in view of the nomadic existence of these primitive folks this explanation is highly probable. The outstanding fact remains that the skeletons are neither Indian nor Malayan and there is no evidence to suggest that they are hybrids of these two peoples. Although the amount of information obtainable from the appendicular skeletons is slender, it all helps to strengthen the

chain of evidence in favour of a Negrito or Protomalayan origin. If further evidence is required that we are dealing primarily with a pigmy people it is to be found in the remains of the Assoc. 3 group. If only one of the three skeletons had been of pigmy stature the occurrence might have been considered adventitious but when two are undoubtedly of small stature, we are justified in accepting this as the dominant condition.

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DESCRIPTION OF PLATES.

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|------------|----------|--|------------------|
| Plate I. | Fig. 1. | Assoc. 1 Skull. | Norma Frontalis. |
| | Fig. 2. | " " | Lateralis. |
| Plate II. | Fig. 3. | " " | Verticalis. |
| | Fig. 4. | " " | Occipitalis. |
| Plate III. | Fig. 5. | Assoc. 2 Skull. | Frontalis. |
| | Fig. 6. | " " | Lateralis. |
| Plate IV. | Fig. 7. | " " | Verticalis. |
| | Fig. 8. | " " | Occipitalis. |
| Plate V. | Fig. 9. | Comparison of Assoc. 1 skull with female Malay skull (No. 141). | |
| | Fig. 10. | Long bones from all three remains.
Reading from left to right. | |
| | (a) | Radius of Assoc. 3 Remains. (Small mollusc shell adherent to middle of shaft). | |
| | (b) | Femur of Assoc. 3 Remains. | |
| | (c) | Tibia of Assoc. 2 Remains. | |
| | (d) | Femur of Assoc. 2 Remains. | |
| | (e) | Humerus of Assoc. 1 Remains. | |
| | (f) | Femur of Assoc. 1 Remains. | |

[The examination of the skeletal material by Professor J. Gordon Harrower has yielded some rather surprising and very interesting results in that it appears that the people who were buried in the canoes were of Proto-Malayan origin with a Negrito cross, or sometimes even pure Negritos. He suggests that the skeletal remains may not be essentially of the same period as the cultural material and that the burials may be earlier or later. I observed no indications that the burials were not of the same period as the other remains and, accepting Professor Harrower's findings, I do not think that it is impossible to reconcile them with the objects of an Indian culture. I informed Professor Harrower, before he examined the human bones, that I expected from the cultural objects that there might be an Indian and a Malayan element, the latter predominating, to be found in the people inhabiting the site. The inference that there might be an Indian strain in the people was based on the finding of objects that were undoubtedly of Indian origin (such as a seal with the Pallava inscription) and others that were probably so (cornelian and agate beads, etc.). The Malayan element was deduced from the fact that the houses appear to have been of the pile-dwelling type. Professor Harrower has understood my use of the word Malayan in the narrowest sense (as necessarily indicating the Malays proper) while I intended rather to indicate merely peoples of Malayan habits. The Dyaks, too, build houses of the pile-dwelling type. It is, therefore, by no means impossible that in these early times the bead trade that spread from Africa, on one side, to the Philippines on the other was carried on, in so far as the Malay Archipelago was concerned, by some Proto-Malayan sea-roving people, (not necessarily either true Dyaks or Peninsular Sea Gypsies) who had also actually acquired some little skill in working glass and in cutting and polishing semi-precious stones. They must, if this is so, have been in touch with Indian traders and considerably under Indian influence as were, at that time, the inhabitants of the whole Malayan area—the Malay Peninsula, Sumatra, Java, Borneo, the Philippines, etc. As a matter of fact I have pointed out previously, in various papers on the Kuala Selinsing settlement, seeming Bornean affinities of some of the objects found there, notably the shell bracelets and a certain type of shell bead—quite apart from the stone and glass beads. It is remarkable, too, that the only gold earring that at all resembles the specimen bearing a representation of a human figure mounted on a bird, described in my paper on excavations at Kuala Selinsing in *Journ. of the F.M.S. Museums*, vol. XV, part 3, was found at Maragasari in the S. E. Residency of Dutch Borneo.

As to the existence of Negritos at Kuala Selinsing, that, too, is not very difficult to explain. It is known that, comparatively recently, Negritos ranged to the sea coast, or not far from it

Wilkinson (*Papers on Malay Subjects, The Aboriginal Tribes*, pp. 10 and 11) speaks of a Negrito (the last there) being enumerated in Province Wellesley in 1891. He also mentions them as being in the Matang Sub-District at the time that he wrote (1911). There are none there now. I believe that there were a few persons belonging to the now extinct, or almost extinct, division which called itself Menik Kaien. A man of this tribe, whom I met, claimed that his people once ranged from Batu Kurau in Perak, to Bruas, on the coast (Evans, *Studies in Religion, etc.* p. 144). Anderson, in 1824, (*Considerations*, p. XXXVIII) speaks of them as being numerous near Gunong Jerai (Kedah Peak). It would seem probable, therefore, that the Negritos were slaves or hangers-on of the superior Proto-Malayans. No doubt, too, if the Proto-Malayans were short of women-folk, they would take some from the Negritos and thus a mixed breed would arise. I. H. N. Evans].

A LIST OF THE LAND AND FRESH-WATER MOLLUSCA OF THE MALAY PENINSULA.

By F. F. LAIDLAW, M.A.

Land Mollusca pt. II, Pulmonata.¹

The first part of this list was published in this Journal in 1928 (Vol. VI).

As indicated in the Introduction, the difficulties attending the present part of the list are much greater than those which arose in dealing with the Operculata, and have been responsible for the lapse of so long an interval of time between the appearance of the two parts.

This part of the list must be taken as a first attempt to deal with a part of the Malayan fauna which is still very imperfectly known, and accordingly its many and obvious short-comings I hope will be dealt with leniently.

A comparison with the Pulmonate fauna of Borneo and Sumatra would be interesting but no recent lists, so far as I know are available.

Miss van Benthem Jutting has published a list for Java (Treubia, vol. XI, Livr. I, 1929).

She gives 159 species of terrestrial Pulmonata as inhabiting Java (I have omitted 'varieties'), and of that number only 13 are shared with the Peninsula. Of the thirteen, all, I believe, are species whose range has been extended by human activities.

I have followed in general the classification given by Thiele in his Handbuch der Systematischen Weichtierkunde II (Gustav Fischer, Jena, 1931).

Species that I have examined myself are marked with an asterisk (*). Species doubtfully native are marked (†).

i Rathouisiidae.

**Atopos tourannensis* Eyd. and Soul.

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Atopos sarasini, Collinge, 1902, p. 87, Pl. V, fig. 40-42.

Atopos harmeri, Collinge, 1902, p. 89, Pl. V, figs. 43-54.

Atopos tourannensis, Hoffman, Vid. Medd. Dansk. Naturh. Foren. Bd. 81, p. 27.

¹ For Part I see Journ. Malay Br. Roy. Asiat. Soc., VI, 1928, p. 25.

I have before me a specimen from the Cameron Highlands. Collinge records his species from Biserat, and from the Kelantan-Legeh border.

Atopos rugosus Collinge.

Atopos rugosus, Collinge, 1902, p. 90, Pl. V, fig. 46-48.
Hoffman, loc. cit. p. 30.

Recorded from Biserat.

Atopos maximus Collinge.

Atopos maximus, Collinge, 1903, p. 213, Pl. XI, fig. 5-6.
Hoffman, loc. cit. p. 31.

***Atopos sanguinolentus** (Stoliczka MS.) Ghosh.

Atopos sanguinolentus, Ghosh, Rec. Ind. Mus., 1912, Vol. VII.

Atopos laidlawi, Collinge, 1902, p. 90, Pl. V, fig. 53-55.

Atopos strubelli, Collinge, (nec Simroth), 1902, p. 90.

Atopos sanguinolentus, Hoffman, loc. cit. p. 31.

Recorded from Penang, Biserat, Ban Kong Rah. I have seen a specimen from Gunong Pulai, Johore, in the collection of the F.M.S. Museums.

I have followed Hoffman in regarding the number of species named as unduly large. At the same time I must admit that I have not been able to study any series of specimens, still less to compare their anatomy. Till this has been done the use of specific names must remain a matter of personal feeling.

I am able to add Johore and Pahang to the list of States from which examples of these very remarkable molluscs have been recorded. They are probably the most primitive of existing land-mollusca. Their anatomy is of great interest, and it is very desirable that a full account, drawn from well preserved material, should be drawn up.

The best available descriptions are those of Simroth (Zeit. f. wiss. Zool., 1891, Bd. 52 pp. 593-616, Taf. XXXVII), and of Odhner (Kungl. Svenska Vetensk. Akad., 1917, Bd. 52, No. 16, pp. 90-96, text-figs. 45-51).

ii *Vaginulidae* (= *Veronicellidae*).

This Family has a much wider range than the last. It is in fact holotropical. In my list I have followed the arrangement adopted by Grimpé and Hoffman in their paper "Versuch einer Revision der indischen, indo— und polynesischen Vaginuliden."

Zeit. wiss. Zool. 1925, pp. 1-50.

Meisenheimeria alte (Ferussac).†

Vaginulus alte, Ferussac, Hist. nat. etc. des Mollusques terr. et fluv. etc. 1823.

Grimpe and Hoffman record specimens (in the Berlin Museum) from Penang.

Semperula idae (Semper).

To this species are referred forms recorded from Biserat in Jalon as possibly conspecific, though the authors of the Revision appear to have made the mistake of supposing that "Biserat-Johor" (sic) is in Borneo.

Collinge has also figured and very briefly described, but not named, two other examples of slugs probably of this species (Collinge, Fasc. Malay., Zool. II, p. 216, Pl. XI, figs. 7, 8, 9, 10).

See Grimpe and Hoffman, loc. cit. pp. 33-36.

Semperula birmanica (Theobald).

Veronicella birmanica, Stoliczka, Journ. Asiat. Soc. Bengal, Vol. XLII, pp. 11-38.

Stoliczka records this species from Penang.

Semperula maculata (Templeton).†

Vaginula maculata, Semper, Reisen im Archipel der Philippinen, Tl. 2, Bd. III, 1870.

Simroth (S. B. Naturforsch. Ges. Leipzig, Bd. XVII-XVIII) has described several species from Further India and the Malay Archipelago which are regarded by Grimpe and Hoffman as synonyms of this species, no doubt correctly. He records Singapore as one of the localities where this widespread species occurs. It ranges from Madagascar to the Philippines and Amboina.

And in addition Miss Van Benthem Jutting gives *Vaginula bleekeri* Keferstein as found in the Peninsula.

iii. *Vertiginidae*.

GASTROCOPTINAE.

Gastrocopta palmira (Stol.).

Pupa (Scopelophila) palmira, Stoliczka, J.A.S.B., XLII, 2, 1873, p. 32, Pl. 3, fig. 3a-3b.

Gastrocopta palmira, Pilsbry, Man. of Conch., XXIV, p. 139-140, Pl. 25, figs. 4, 9.

"Penang and in the Province Wellesley, under the bark of *Cocos nucifera*. It appears to be a very rare species."

Paraboysidia kelantanensis Sykes.

Boysidia kelantanense, Sykes, Journ. of Malac., IX, 1902, p. 61, Pl. 3, fig. 7.

Boysidia kelantanensis, v. Mollendorff, Nachrbl. Deut. Malak. Ges., 1902, p. 139.

(See also Pilsbry, loc. cit. supra).

Kelantan.

(The next genus *Gliotrachela* Tomlin, includes species formerly arranged under the generic name *Gliauchen* Pilsbry, a name which as Tomlin has pointed out, is preoccupied. Reference may be made to Pilsbry's work quoted above, to von Mollendorff's descriptions of new species, Proc. Zool. Soc. London, 1894 and to a note on species from the Archipelago by Miss T. van Benthem Jutting in the Journal of Conchology, Vol. 19, 1932, p. 204, Pl. VII, fig. 9a-b-c-d-e).

**Gliotrachela hungerfordiana* (Mlldff).

Kelantan.

Gliotrachela transitans (Mlldff).

Samui Is.

Gliotrachela striolatus (Mlldff).

Samui Is.

**Gliotrachela laidlawi* (Collinge).

Hypselostoma laidlawi Collinge, Journ. of Malac., 1902, IX,

p. 83, Pl. V, fig. 29-30.

Caves, Biserat in Jalor.

iv *Valloniidae*.*Pupisoma orcella* Stol.

Pupisoma orcella, Pilsbry, Man. Conch., XXVI, p. 29, Pl. 3, figs. 5-6-7.

v *Clausiliidae*.**Clausilia penangensis* Stol.

Clausilia (Phaedusa) penangensis, Stoltzka, J.A.S.B. XLII, 1873, p. 27, Pl. II, figs. 4-6. Collinge, Fasc. Malay. Zool. II, 1903, p. 212.

Penang, Perak, Nawng-Chik, Kelantan.

**Clausilia filicostata* Stol.

Clausilia filicostata, Stoliczka, loc. cit., pp. 28-29, Pl. III, figs. 7-8.

Penang, Batu Caves Selangor.

Clausilia kapayanensis de Morgan.

Clausilia (Pseudonenia) kapayanensis, de Morgan, Bull. Soc. Zool. de France, 1885, X, pp. 391-392, Pl. VI, fig. 8.

I have not seen this species, but from de Morgan's figures it seems to me to be very like *filicostata*, which is decidedly variable in respect of the number of its whorls. Recorded from Perak.

***Clausilia kelantanensis Sykes.**

Clausilia kelantanense, Sykes, Journ. of Malac., IX, 1902,
p. 22 and p. 61, Pl. III, fig. 1.

Collinge, Fasc. Malay Zool. II, 1903, p. 212.

Kelantan and Nawng-Chik.

***Clausilia pahangensis Laidlaw.**

Clausilia pahangensis, Laidlaw, Proc. Malac. Soc.
Pahang, and perhaps the Larut Hills, Perak.

***Clausilia orites Laidlaw.**

Clausilia orites, Laidlaw, J. Conch. Soc.
Cameron Highlands, Pahang.

vi *Achatinidae*.

ACHATININAE.***Achatina fulica Fer.†**

An African species, notable for its large size. According to a Museum note it—"became established in Calcutta during the middle of the last century, and was recorded as fairly common all over Northern Bengal by 1910. It was also introduced into Ceylon about 1900, and has been responsible for much damage in parts of that country. It was introduced into Malaya, probably by accident some years ago, and became established first in Kedah, and then spread into Province Wellesley. It is preyed upon by the larva of a glow-worm."

It has spread also in many of the islands of the Indian Ocean.

STENOGYRINAE.

(For a full account of the forms referred to this sub-family reference should be made to Pilsbry's work in Tryon's Manual of Conchology Vol. XVIII, 1906).

***Subulina octona Bruguiere.†**

This species is found almost wherever tropical agriculture is practised. It is probably a native of the West Indies.

It has evidently found a congenial home in the Batu Caves in Selangor, but is to be found all over the cultivated parts of the Peninsula.

***Curvella jousseaumei (de Morgan).**

I have seen specimens from the Batu Caves, Selangor. Recorded from Perak by de Morgan and Collinge under the generic name *Hapalus*. The range of the genus *Curvella*, is from tropical Africa, through tropical Asia to the Philippine Islands.

***Prosopeas tchehelense** (de Morgan).

Prosopeas swettenhami (de Morgan).

These two forms are regarded by Pilsbry as synonyms. *Tchehelense* was described from the Plus valley, and *swettenhami* from near Ipoh.

De Morgan was a very skilled and critical conchologist and I do not feel sure that in naming two species he had not some good reason. At any rate it would be worth while to have some attention paid to the matter before making a final decision.

Like other members of the sub-family in Malaya the members of this genus thrive enormously in caves, where bats' dung evidently affords them a suitable nutrient medium. They are to be found also under stones etc. in damp shady places.

***Opeas gracile** Hutton.†

Another widely spread species which has been accidentally introduced into the Peninsula.

This again is one of the species found in the Batu Caves.

Opeas didyma Westerlund.

Recorded by its author from Singapore, it does not seem to have been found since.

(Westerlund, Vega-Exped. Vetenskap. Arb. IV, p. 197, Pl. 3, fig. 9, 1887).

Plicaxis perakensis (de Morgan).

Perak.

***Plicaxis mirabilis** Sykes.

Rhodina (?) *mirabilis*, Sykes, Journ. of Malac., 1902, IX, p. 22., Pl. III, fig. 2.

Kelantan.

The two last species belong to a genus which so far as is known occurs only in the Peninsula. The anatomy of the animal is unknown.

The other genera of the sub-family have as already noted a wide distribution, and the whole group is especially richly developed in S. America and in Africa, Malaysian countries in particular having a representation which is comparatively poor.

In Africa the *Achatininae* have developed from the ancestral stock of the group and have become a dominant part of the African land-molluscan fauna.

The Malayan species of the *Stenogyrinae* are all whitish or horn-coloured shells, elongate spindle-shaped, and without colour markings.

Opeas doveri Ghosh and *Opeas dimorpha* Ghosh, described from the Batu Caves, (Ekendranath Ghosh, Journ. Fed. Malay States Museums. XIV, 1928 (pp. 335-337), must be regarded as synonyms of *Subulina octona* and *Prosopeas tchehelense* respectively.

Miss Jutting in her list of Land and Fresh-Water Mollusca from Java, gives *Opeas javanicum* Reeve as occurring in Malaya, and also *Prosopeas turricula* v. Marts.

vii *Endodontidae.*

ENDODONTINAE.

**Philalanka sericea* Laidlaw.

Philalanka sericea Laidlaw, Bull. Raff. Mus., 7, 1932, p. 41
• (Batu Caves, Selangor).

A number of dead shells from the Batu Caves, Selangor.

viii *Ariophantidae.*

MACROCHLAMYDINAE.

Hemiplecta

A. Large species, (diam. max. 60mm. app.)

Periphery angulate, spire rather elevated, umbilicus narrow:

**Hemiplecta pluto* Pfr.

Recorded from the Northern and North-Eastern parts of the Peninsula.

Periphery not angled.

Umbilicus narrow.

**Hemiplecta humphreysiana* Lea.

Common all over the lowlands of the Southern half of the Peninsula, becoming scarcer or absent in the North.

Umbilicus widely open.

**Hemiplecta floweri* Smith.

Confined, so far as is known to the Larut Hills.

B. Medium sized species (diam. max. 45mm. app.)

Periphery distinctly carinate:

**Hemiplecta cymatium* (Bens.).

Only definite records are from Penang, but probably occurs in Perak and elsewhere on the Mainland.

Periphery angulate.

**Hemiplecta densa* ad. & Reeve.

I have seen specimens only from the Batu Caves in Selangor. They agree closely with Bornean Examples.

Periphery rounded, surface of shell not enamelled:

***Hemiplecta malaouyi** de Morgan.

Found only at considerable elevations in the central mountain of the Peninsula.

Periphery rounded, surface of shell not enamelled:

***Hemiplecta** sp.

This appears to be an undescribed species, it is similar in size and shape generally to the last species, but the texture of the shell is quite different as is its colour, a pale fawn-brown, as opposed to olive-green and purple. I have seen two examples from Bukit Kutu, Selangor.

***Pangania lowi** (de Morgan).

Helicarion lowi, de Morgan, Bull. Soc. Zool. France, X, p. 373, Pl. 5, figs. 3a-d.

Nilgiria lowi, Collinge, 1903, pp. 207-208, Pl. XII, figs. 14-16.

Pangania lowi, Laidlaw, Proc. Malac. Soc., XX, 1932, pp. 81-84.

This species is evidently abundant on the Cameron Highlands, it occurs also on the Larut Hills.

***Sarika planata** n. sp.

Several specimens, Tanah Rata, Cameron Highlands, Pahang, 4500 ft. May-June 1931.

Closely related to *S. limbata* v. Molldri. from Koh Tao.

Shell dextral, with flattened spire, the last whorl slightly descending. Colour rather dark brown, almost uniform. Whorls about five. Surface smooth, polished, marked with very numerous fine lines of growth. Scarcely perforate, suture well impressed. Breadth 13mm. alt. max. 5mm.

(Compared with *limbata* the spire is even flatter than in that species, the last whorl is slightly more globose, and descends less. An example of *limbata* det. Tomlin, measurts. Breadth 13mm. alt. max. 5.5mm.).

Anatomy that characteristic of the genus.

The penis has a long uncoiled coecum to which the retractor muscle is attached, it also bears a long spermatophore-sac which opens into it at the point where it is joined by the vas deferens.

The receptaculum seminis has a long slender stalk, and the dart-sac is long and convoluted.

The radula bears a strong resemblance to that of other species of the genus. The formula is 49-10-1-10-49. The laterals are rather sharply marked off from the admedians, and the ectocone on the laterals and inner marginals is small and the laterals are

long and slender. *Limbara* has a very similar formula 45-12-1-12-45, and a fairly close general likeness, but on the laterals and inner marginals the ectocone is much larger, equal to the mesocone, and the marginals are not so slender.

***Sarika auriettae** Tap.-Can.

Several shells of this species were collected by the late Dr. Annandale near the Tale Sap in Siamese Malaya. The specimens were identified for me by Col. Godwin-Austen.

Sarika resplendens (Philippi).

Macrochlamys resplendens, Collinge, Fasc. Malay., Zool. II, 1903, p. 209.

Bukit Besar, Nawng-Chik, 3000 ft.

***Macrochlamys indica** Stol.†

The Raffles Museum has a specimen of this species which is without precise localization. It has been identified by Mr. Robson.

Macrochlamys hardwickei Godwin-Austen.†

Macrochlamys hardwickei, Collinge, Fasc. Malay Zool. II, p. 209.

Recorded from Cape Patani.

Two other species, recorded as *Macrochlamys* by their authors must I think, for the present be regarded as *Incertae sedis*. They are,

Macrochlamys stephoides Stol.

Helix (Macrochlamys) stephoides, Stoliczka, J. As. Soc. Beng., XLII, 1873, p. 17, Pl. I, fig. 9, Pl. II, fig. 19-20.

Penang, Kinta Valley, Perak.

Macrochlamys bartoni de Morgan.

Macrochlamys bartoni, de Morgan, Bull. Soc. Zool. de France, X, 1885, p. 30, Pl. I, fig. 8.

Kinta Valley, Perak.

DURGELLINAE.

Without fuller information the limits of this sub-family must be regarded as doubtful.

At present it may be taken to include forms with a loosely coiled, thin shell, in some genera undergoing degeneration; with well developed shell-lobes on the mantle, and with a compressed tail, the visceral hump being usually situated far forward, perched as it were on the neck of the animal. Radula peculiar,

about as broad as long, rows of teeth markedly oblique, teeth small and very numerous, central tooth narrow, and justly compared by Godwin-Austen to the conventional figure of a fleur-de-lys. The outer teeth in *Durgella* are pectinate and quite different to those of the other genera, in which they are usually very slender and bi- or tricuspid. The dart-sac is relatively smaller than in *Parmarion*, and not so definitely stalked. It is absent in *Satiella*. The slug-like forms referred to this subfamily are richly represented in Borneo.

***Durgella ? hatchongi de Morgan.**

On conchological grounds only I put this species here. Its anatomy is quite unknown.

I think it possible that the species I have recorded from Mt. Ophir, Johor, as *Megaustenia ophiria* (Pfr.) may also turn out to be a *Durgella*.

Hatchongi occurs outside the Batu Caves in Selangor, as well as in Perak.

Described by de Morgan as a *Macrochlamys*. (Bull. Soc. Zool. de France) von Möllendorff regarded this and another of de Morgan's species viz. *Macrochlamys jousoufi* as closely allied to *Macrochlamys kumahensis* Theob. & Stol. from Avakan (See v. Möllendorff Proc. Zool. Soc. London, 1891, p. 332).

***Ibycus perakensis (Godwin-Austen).**

Leptodontarion perakensis, Godwin-Austen, Proc. Malac. Soc., 1909, VIII, pp. 365-367, Pl. V, figs. 1-1d.

Recorded from Talam, Perak, (near Gunong Inas). I have several specimens before me from the Larut Hills, Perak, alt. 4500 ft.

(Collinge's genus *Paraparmarion*, with the species *elongatus* Collinge is certainly allied here closely, it also comes from Gunong Inas, Perak. See Collinge, Journ. of Malac., 1902, IX, pp. 75-76, Pl. V, figs. 34-36).

Damayantia minima Collinge.

Damayantia minima, Collinge, Fasc. Malay Zool., Pt. II, 1903, p. 206, Pl. XI, figs. 1-2.

Gunong Batang Padang, S. Perak.

In this genus the shell is completely enclosed in the mantle. Except for this species the genus is known only from Borneo. Godwin-Austen has figured the radula of one of the Bornean species, *carinata* Collinge, and has shown that it conforms closely to the type of radula found in *Ibycus* and in the Bornean genus *Isseletania*.

Otherwise little is known of the anatomy of the genus. (See Godwin-Austen, Proc. Malac. Soc., 1903, V, pp. 311-316, Pl. XI).

Another genus named and figured by Collinge (Journ. of Malac., 1902, IX, p. 76, Pl. V, figs. 37-39) as *Cryptosemelus* with type species *gracilis* Collinge, is also probably to be referred to this sub-family. The species was taken on Bukit Besar, Nawng Chik.

Sitala infula Benson (?).

Sitala infula (?) Collinge, Fasc. Malay Zool. II, 1903, p. 210, Bukit Besar, Nawng-Chik.

The species, the type of the genus, has a fairly wide range, from Calcutta to Moulmein.

Collinge remarks (supra) that the Malayan specimens have "the general outline of *infula*, but the first five whorls have each a single, well-marked, spiral rib, whilst the last whorl has two. There is a specimen of the same species, unnamed in the British Museum, from Kelantan."

***Sitala carinifera** Stol.

Sitala carinifera, Stoliczka, J.A.S.B., 1873, XLII, p. 16, Pl. I, figs. 8a-8c.

— Collinge, Journ. of Malac., 1902, IX, p. 81, Penang, Gunong Inas, 3500 ft., Perak, Batu Caves, Selangor.

Sitala (?) permolle Stol.

Helicarion permolle, Stoliczka, J.A.S.B. XLII, 1873, p. 18, Pl. I, fig. 11, Pl. II, figs. 21-23.

Helicarion permolle, Godwin-Austen, Proc. Malac. Soc., VIII, 1909, p. 365-368.

Sitala (?) gunongensis Godwin-Austen.

Sitala (?) gunongensis, Godwin-Austen, loc. cit. supra, Gunong Inas, Perak.

GIRASIINAE.

***Cryptaustenia partridgei** (Collinge).

Apoparmarion partridgei, Collinge, Journ. of Malac. IX, pp. 73-75, Pl. IV, figs. 5-12; Pl. V, figs. 31-33.

Cryptaustenia partridgei, Laidlaw, Proc. Malac. Soc., XX, 1932, pp. 89-91.

Gunong Inas, Perak, Cameron Highlands, Pahang.

Girasia peguensis (Theobald).

Girasia peguensis, Collinge, Journ. of Malac., IX, pp. 76-77, Pl. IV, figs. 13-14.

Belimbing, in Lige.

Megaustenia sp.

Cryptosoma sp., Collinge, Tom. cit. supra, pp. 77-78, Pl. IV, fig. 15.
Bukit Besar, Nawng-Chik.

***Megaustenia? ophiria (Pfr.).**

Megaustenia ophiria, Laidlaw, Proc. Malac. Soc., XX, 1932,
p. 91.

Mt. Ophir, Johor.

The position of this species remains uncertain, it may belong to the *Durgellinae*.

PARMARIONINAE.

This subfamily ranges through the Archipelago from Indo-China and Malaya. It has been divided up into a small number of genera, none of which seem to me to be satisfactorily defined, and for the present I prefer to leave all the species in the typical genus *Parmarion*.

This genus includes a number of slug-like animals, all with degenerate, membranous shells, whilst the visceral hump in the extended animal, lies at about the middle of its total length, and is not perched so far forward as in such a genus as *Leptodontarion*.

The shell is surrounded by the mantle in every case, but so far as I know, is never completely concealed by it. The mantle further seems to be without shell-lobes, unless indeed these are fused to the backward extension of the dorsal lobes, an arrangement suggested by the curious keels found on these in some species.

The genital structures are especially characterized by the large egg-shaped dart-sac, which communicates with the genital atrium by means of a relatively slender stalk; in this latter a calcareous dart has been found in many species, though in some cases the dart appears to be chitinous.

The penis shows a great range of complexity. In some species, as for example those recorded from Malaya, the organ consists of a simple tubular structure, into which the relatively short vas opens at its upper end near the insertion of the retractor muscle, whilst the spermatophore sac is a small simple diverticulum, also lying near the insertion of the retractor muscle, usually opposite the opening of the vas. In other species the vas becomes widened before it opens into the penis, and in species referred to the subgenus *Collingea* this widened part of the vas is thrown into a remarkable system of loops, which are tied down to the upper end of the penis by muscle, giving the whole structure a striking specific individuality.

The spermatophore also so far as known is quite characteristic of the subfamily. It has usually the shape of an S, the lower limb of the S being produced as a long slender tail, whilst on the convex curvature of the upper limb there are arranged a number of parallel comb-like plates. Receptaculum seminis sessile.

Radula, central and admedian teeth with quadrate plates, central tooth tricuspid, laterals usually with well-developed ectocones, marginals sometimes tricuspid. Approximately 200 teeth in each row.

**Parmarion malayanus* Collinge.

Parmarion malayana, Collinge, Fasc. Malay. Zool., Pt. II, 1903, pp. 206-207, Pl. XI, 3, 4, Pl. XII, 11-13.

2 specimens, from the Cameron Highlands, Pahang, 4500 ft. June 1931. I quite young from Gunong Jerai, Kedah.

These agree precisely with Collinge's description and figures. Length about 30mm.

Body fawn coloured, with irregular, dark brown markings on the mantle only, consisting of wavy lines and fine spots interspersed.

Mantle with a distinct keel, extending from immediately behind the mantle pore right round the shell, and well on to the left dorsal lobe.

A blue-gray band runs back from each of the upper tentacles to the visceral mass.

Shell very delicate, greenish amber in colour, whorls about $2\frac{1}{2}$. Length 6.5mm. Breadth 4mm.

The most noteworthy points as regards the genital organs are the short, rather stout vas, the small, egg-shaped spermatophore-sac, and the short vagina, which is not much thicker than the penis in the specimen I dissected. The receptaculum seminis is sessile, and I was lucky enough to find in my specimen a fully developed spermatophore lying in it, and greatly distending it.

This was damaged in removal almost unavoidably.

It is shaped like a letter S, the upper half of the S being thickened and evidently containing a large quantity of sperm. Along the convex side of this thickened part there lie a number of regularly placed rows of chitinous spines, four or five spines in each row, and about fifteen rows in all. The lower half of the S is a slender, chitinous tube, tapering gradually, and ending in a long filiform tail, which has been broken off.

The length of this structure, omitting the filiform tail, is about 6mm., not measured along the curve. It bears a fairly close resemblance to the spermatophore of *P. weberi* Simroth, figured by Simroth (Zool. Jahrb. Jena, 1898, XI, Taf. 15, fig. 12).

The 'tail' is of considerable length, not less than 6mm. but is much twisted.

Radula. Formula + 98-26-1-26-98 +.

****Parmarion peilei* n. sp.**

A single specimen, rather damaged from the Cameron Highlands, Tanah Rata, 4500 ft. 27-5-31. "Jungle."

Length about 25mm. Colour dark gray-black, the reticulations are darker than the rest of the surface. The shell, which is rather badly crushed is yellowish green, extremely delicate, and perfectly transparent. Its length is 11mm. and extreme breadth 9mm. Whorls about $2\frac{1}{2}$.

The mantle is rather darker than the rest of the body in colour, the foot-fringe is marked with yellow lineolae, and the sole is dull yellow, darker at the sides, divided into three longitudinal planes.

The mantle has a distinct keel extending from immediately behind the mantle-pore, right round the shell, and on to the left dorsal lobe. It is interrupted in the middle line posteriorly.

The rugae, especially on the tail, are oblong, not diamond-shaped.

The structure of the genital apparatus is very similar to that of *malayanus* Collinge.

The vas opens into the proximal end of the penis close to the point of insertion of the retractor muscle. At the same level the spermatophore-sac opens. This is a small ovate structure.

The dart-sac is of the type usual in the genus, a large ovoid sac which communicates with the vestibule by a cylindrical stalk.

The receptaculum seminis is rather elongate and club-shaped.

The radula is likewise very similar to that of the last species. There are approximately 150 rows of teeth, and about 240 teeth in each row.

The central tooth has a large mesocone, and small ectocones which lie at about half its length. The basal plate is quadrate. The admedian teeth have a large mesocone and a small ectocone, which lies well below the summit of the mesocone. The laterals are slender and have the mesocone and ectocone of equal size. The outermost marginals, about ten in number have developed an accessory ectocone, so that they are tricuspid, and in a few cases even quadricuspid. Formula 93-23-1-23-93.

The radula of *malayanus* is exceedingly similar, differs only in that the teeth in each row are slightly more numerous and the outer laterals perhaps a trifle more slender, a point about which it is difficult to be accurate.

The jaw of *peilei* shows a very irregular cutting edge, a feature which is probably the result of injury sustained in removing it from

the body of the animal, or in some other accident. That of *malayanus* has an almost regularly curved edge, slightly bowed convexly at its middle.

The two species are evidently closely allied, though the appearance of the two is strikingly different. I think it possible that *pelei* is identical with the form figured under the name *Helicarion* sp. from Singapore by v. Martens in Preuss. Exped. Ost-As. II, 1867, Taf. V, fig. 5.

I have examined also a slug-like species from Kedah Peak, the individuals are unfortunately all quite immature and though they almost certainly belong to an undescribed species I cannot do more than mention them here.

****Parmarion doveri* Laidlaw.**

Parmarion (Wiegmannia) doveri, Laidlaw, Proc. Malac. Soc., XVIII, 1929, pp. 260-262.

Selangor.

The external character employed in defining this genus namely the presence of a median and two lateral grooves on the body in front of the mantle is not valid. I have found that precisely similar grooves exist in the Bornean species *Collingea pollonerae* Collinge and Godwin-Austen. I have referred *doveri* accordingly to the original genus, especially as the rest of its organization is so very similar to that of other species of *Parmarion*.

I am not able to place two slug-like molluscs described by Stoliczka and de Morgan respectively. I give the names here without comment.

Vitrina nucleata Stol.

Vitrina nucleata, Stoliczka, J. As. Soc. Bengal, XLIII, 1873, p. 23, Pl. I, fig. 12; Pl. II, figs. 4-6.

Bukit Pondong, Perak, Penang.

Gaeotis douvillei de Morgan.

Gaeotis douvillei, de Morgan, Bull. Soc. Zool. de France, vii. 1885, p. 40, Pl. IV, fig. 9.
Mt. Tchabang, Perak.

DYAKIINAE Laidlaw.

Dyakia Godwin-Austen.

I think that this genus ought to be restricted so as to include only the (normally) sinistral species at present referred to it. It will then be a natural and easily defined collection of species, ranging from S. Burma over the Malaysian area.

The Malayan species seem to be a little difficult to define. I believe there are three main groups.

***Dyakia salangana** (von Martens).

This is a northern form, reaching as far South as Perak. It is closely related to the Burmese species *retrorsa* (Gould), perhaps only a local race; and is I think identical with *lahatensis* (de Morgan).

***Dyakia hugonis** (Pfeiffer).¹

Recorded by me from Pulau Aor off the E. coast of Johore, and as a very immature specimen from Sungai Rumpan, Pahang. This species differs from the last in the much more closely coiled shell, and from the next in having the last whorl without angulate periphery.

***Dyakia janus** (Beck).

Records of this species are all from the Southern half of the Peninsula. The species is variable, and may even run into the last.

I have seen this species from Johore, Selangor, Pahang and it is recorded from Malacca and from Perak by de Morgan as *kintana*. Other synonyms are *sannio* (Pfr.) *albersi* Mart. and *mackenziana* (Soul.).

(See Laidlaw, Proc. Malac. Soc., XIX, 1931, pp. 190-201).

***Xestina striata** Gray.

Helix naninoides Benson.

Hemiplecta leechi de Morgan.

One of the commonest land-shells of the Peninsula. It is closely allied conchologically to *javanica* Lam., and to *siamensis* Pfr., and other species, with which it should probably lie in a distinct genus. As the synonymy of the group is involved I leave it at present.

TROCHOMORPHINAE.

Trochomorpha.

The species of this genus are conchologically difficult, and as I have but scanty material to deal with I can do no more than give a bare list of the few species of the genus that have been recorded.

Trochomorpha castra Benson.

Trochomorpha castra, Stoliczka, J.A.S.B., 1873, p. 21, Pl. I, figs. 14-16, Pl. II, figs. 7-9.

Trochomorpha castra, Collinge, Journ. of Malac., IX, 1902, p. 81.

(See also Godwin-Austen, Proc. Malac. Soc., I, 1895, pp. 283-287).

Ranges from Darjiling through Assam, Burma, and the Malay Peninsula.

¹ See note at the end of this paper.

Trochomorpha timorensis v. Martens.

Trochomorpha timorensis Stoliczka, loc. cit. supra.

Trochomorpha timorensis Collinge, Fasc. Malay. Zool., II, 1903, p. 210.

I am not sure that this species is correctly identified. Perhaps the Malayan form should be *planorbis* Less. which I see Miss van Benthem Jutting records from Malaya in her list referred to above.

Trochomorpha cantorianae Benson.

Recorded from Pulau Song-Sung, near Penang.

Trochomorpha grubaueri Mlldff.

Trochomorpha (Sivella) grubaueri, v. Mollendorff Nachr. Deutsch. Malak. Gesell., 1902, p. 161.

(? = *Trochomorpha timorensis*, Morgan Bull. Soc. Zool. Fr. x, 1885, p. 35. v. Mollendorff Proc. Zool. Soc. London, 1891, p. 334, nec. Marts.).

Trochomorpha kelantanensis Mlldff.

Trochomorpha (Sivella) kelantanensis v. Mollendorff Nachr. Deutsch. Malak. Gesell. 1902, p. 139.

De Morgan described two species *Helix swettenhami* and *Helix thieroti* (Le Naturaliste, 1885, p. 68). These are not mentioned in his second memoir (Bull. Soc. Zool. de France, X, 1885).

von Möllendorff remarks in his list of Land and Freshwater shells of Perak that these both belong either to *Trochomorpha* or else *Plectotropis*, and that the latter species is probably the same as the form that Möllendorff calls *T. timorensis*.

***Eurybasis lychnia** Bens.

Three specimens from Gunong Pulai, Johore.

Diam. max. 13mm. Alt. 7mm. Whorls about $6\frac{1}{2}$. The carina is distinctly double, the upper thread of the two which form the keel is distinctly less produced than the lower.

Recorded also from Singapore Island.

***Eurybasis** sp.

Known only from a single dead shell from Gua Tembus, near the Batu Caves, Selangor.

Smaller than *lychnia* and with a spire relatively more elevated; the carina is single.

Diam. max. 8mm. Alt. 5mm. Whorls $6\frac{1}{4}$.
Incertae sedis.

***Pseudoplecta bijuga** (Stol.).

Rotula bijuga, Stoliczka, J.A.S.B. 42, 1873, p. 14, Pl. II, figs. 16-18.

Euplecta bijuga, Collinge, Fasc. Malay. Zool. II, p. 208, 1903.

Pseudoplecta bijuga, Laidlaw, Proc. Malac. Soc. XX, 1932, pp. 91-93.

The species apparently occurs at all altitudes from sea-level to not less than 4500 ft.

It is recorded from the Langkawi Islands, Nawang-Chik, Penang, the Cameron Highlands.

Apparently de Morgan's species *Macrochlamys pataniensis* is also a synonym.

Incertae sedis.

**Kaliella doliolum* (Pfr.).

Vitriniconus doliolum, Semper, Reis. Philip. Jus.

A number of specimens apparently belonging to this species from the Batu Caves, Selangor.

The species is viviparous.

Incertae sedis.

**Microcystis palmicola* Stol.

Microcystis palmicola, Stoliczka, J.A.S.B., XLII, Pt. 2, p. 18, Pl. I, fig. 10, 1872.

? = *Kaliella perakensis* Godwin-Austen, Land and Freshwater Mollusca of India (&c.) I, pt. I, 1882, p. 8, Pl. II, fig. 7.

Several specimens from the Batu Caves, Selangor.

Incertae sedis.

Microcystina townsendiana Godwin-Austen.

Nanina (*Microcystina*) *townsendiana*, Godwin-Austin and Nevill. Proc. Zool. Soc. London, 1879, p. 736, Pl. LIX, fig. 1, a-b.

Bukit Pondong Cave, Perak.

Petasia bouri de Morgan.

Helix (*Petasia*) *bouri* de Morgan, Bull. Soc. Zool. France, p. 35, Pl. II, fig. 3.

Kinta Valley, Perak.

Lamprocystis malayana v. Mlldff.

Perak.

Lamprocystis conulina v. Mlldff.

Perak.

ix *Philomycidae.*****Philomycus pictus* Stol.**

Philomycus pictus, Stoliczka, J.A.S.B. XLII, 1873, pp. 11-38.

Philomycus (Meghimatum) pictus, Hoffmann, Jena. Zeits. LX, 1924, pp. 363-396, Taf. 22.

Penang. Tanah Rata, Cameron Highlands, Pahang, 4500 ft.

The slugs of this genus bear a curious resemblance to *Atopos*, but can be readily distinguished by the presence of a small mantle opening forward on the right side.

It is probable that the species *striatus* Deshayes, and *bilineatus* Benson, will be found in the Peninsula, both, as well as *pictus*, are found in Borneo, whilst the two latter have been recorded from Tonkin and China.

x *Pleurodontidae.*Genus *Amphidromus.*

The Peninsula is relatively poor in species of this genus. Borneo, Sumatra and Java all have a fair number of endemic races or species, whilst the lands immediately to the North of Malaya are possessed of a rich representation of the genus.

Malaya has two forms which represent widely spread species of the section *Amphidromus* (S.S.), and the Museum collection includes examples of a third species which is only recorded hitherto from Annam, and has only been found in the Peninsula by C. Wray at Gapis in Perak, many years ago.

Only a single specimen referable to a species of the section *Syndromus* has ever been taken in the Peninsula, viz. *fultoniana*, collected by Dr. Annandale at Patalung in the North; this specimen is immature, and apparently distinct from its Siamese relatives.

It is almost certain that no representative of *Syndromus* occurs in the Southern part of Malaya, a curious little anomaly in the distribution of the genus.

****Amphidromus perversus perakensis* Fult.**

The group of *peraversus* L. is found in the Philippine Is., Celebes, Palawan, Borneo, Java and Sumatra.

Some members of the group are well localized, and readily recognizable as well marked species.

There are in addition quite a number of named species which are difficult to define, or to distinguish clearly, except on grounds of the habitat from which they are derived. Pilsbry (Man. Conch.) from whose account this note is condensed, separates off as an entity the forms found in the Peninsula and islands as far as the Sunda Strait. To these he gives the name *aureus* (Martyn). The unstriped variety of this form occurs all over the Peninsula and is that to which Fulton later gave the name *perakensis*. But its status as a species rests more on geographical reasons than on any other.

Fulton has called attention to a folding of the columellar callus, as a characteristic feature of this form.

Malay name Siput bulan, Moon snail.

A common arboreal species, its colour renders it inconspicuous.

**Amphidromus inversus*.

Another widely distributed species, found from Borneo Northward to Annam and Tonkin.

It does not seem to be so common in Malaya as the last, but more information is wanted on its habits and occurrence.

**Amphidromus cruentatus*.

The old Museum collection has some examples of this rare species, labelled "Given by C. Wray, Esq., Gapis, Perak." They agree closely with the figure given by Pilsbry (Man. Conch.) but are without the red line at the suture. I have submitted them to Mr. Fulton who kindly examined them and suggested the above determination.

Pilsbry has put the species in the section *Syndromus*, but as exactly 50% of these examples are dextral and 50% sinistral the species seems to belong rather to *Amphidromus* s.s.

**Amphidromus fultoniana* Laidlaw.

Amphidromus fultoniana, Laidlaw, Proc. Malac. Soc.
Amphidromus fultoni, Laidlaw, nec. loc. cit.

The only representative of the section *Syndromus* definitely known from the Peninsula.

**Ganesella perakensis* Crosse.

(See note by Gude, Fauna of British India, Mollusca, Vol. II, pp. 194-195, under *Ganesella acris* Benson).

Perak.

Chloritis.

Sub-genus *Trichochloritis*.

The species of this genus have depressed spiral or rather discoidal shells, usually of a dull brown colour. The apical whorls show under a hand-lens hair-scars often regularly arranged, and frequently persistent over the whole shell.

Gude has published a list of species of the genus, and to this list reference may be made for the species listed below. (Gude, Proc. Malac. Soc. VII, 1906, pp. 105-119).

C. delibrata Bens.

This species and the next two are recorded here on the authority of v. Mollendorff. (Proc. Zool. Soc. London, 1891, p. 336).

Gude (loc. cit.) gives *procumbens* Gould as a synonym of *delibrata*.

Bengal, Assam, Burma.

C. gabata Gould.

Burma, Mergui.

C. deliciosa Pfr.

Cambodia.

C. penangensis Stol.

Penang, Perak.

***C. malayana** Mlldff.

Perak.

***C. platytropis** Mlldff.

Patani, Langkawi.

xi *Fruticicolidae*.

FRUTICICOLINAE.

***Bradybaena similaris** (Fer.).†

Eulota similaris, Gude, Fauna of British India, Mollusca, II, p. 200-201, 1914.

This species is found wherever coffee is cultivated. Its home is probably Burma. I have seen specimens from a number of localities in the Peninsula, and it is evidently very abundant on Gunong Pulai in Johore.

Philidora wrayi de Morgan.

Philidora wrayi, de Morgan, Bull. Soc. Zool. France, X, 1885, p. 37.

Chloritis wrayi, v. Mollendorff, Proc. Zool. Soc. London, 1891, p. 335.

Planispira (Trachia) wrayi, Pilsbry, Manual of Conchology, IX, p. 116.

Kinta Valley.

***Philidora hardouini** de Morgan.

Helix hardouini de Morgan, Le Naturaliste, 1885, p. 68.

Philidora hardouini, de Morgan, Bull. Soc. Zool. France, X, 1885, p. 37, Pl. I, fig. 10a-d.

Chloritis hardouini, v. Mollendorff, Proc. Zool. Soc. London, 1891, p. 335.

Chloritis hardouini, Collinge, Fasc. Malay. Zool., II, p. 211.

Planispira (Trachia) hardouini, Pilsbry, Manual of Conchology, p. 116.

Perak, Kinta Valley. Biserat in Jalor.

I have Mr. Tomlin's concurrence in resuming de Morgan's genus for these two species (or forms?).

Though the anatomy is still unknown the shell characters seem sufficient to make the retention of the name *Philidora* worth while.

The genus seems to me to have as much affinity to '*Eulota*' as to the *Trachia* series.

xii Streptaxidae.

Indoennea malaccana Mlldff.

Ennea (Sinoennea) malaccana, Kobelt, in Mart. & Chemn. Conch. Cab. Erst. Bd. Abt. XII B, p. 287, Pl. 33a, figs. 15–16, 1905.

Ennea (Microstrophia) malaccana, v. Möllendorff, Nachr. Deut. Malac. Gesell., 1902, p. 136.

Kelantan.

Indoennea hungerfordiana Mlldff.

Ennea (Sinoennea) hungerfordiana, Kobelt, op. cit., pp. 345–346, pl. XL, figs. 21–22.

Ennea (Microstrophia) hungerfordiana, v. Möllendorff, J. As. Soc. Bengal, LV, 1886, p. 300.

id., Proc. Zool. Soc. London, 1891, p. 331, Pl. XXX, figs. 22a. Perak.

Indoennea perakensis G.-A. & Nevill.

Ennea (Indoennea) perakensis, Kobelt, op. cit., p. 345, Pl. XL, figs. 18–20.

Ennea perakensis, Godwin-Austen & G. Nevill, Proc. Zool. Soc. London, 1879, p. 735, Pl. LIX, fig. 2.

Ennea (Microstrophia) perakensis, v. Möllendorff, Proc. Zool. Soc. London, 1891, p. 331, figs. 1–1a.

Perak.

Indoennea subcylindrica Mlldff.

Ennea (Indoennea) subcylindrica, Kobelt, op. cit., p. 346, Pl. XL, fig. 23.

Ennea (Microstrophia) subcylindrica, v. Möllendorff, loc. cit., p. 331, Pl. XXX, fig. 3.

Indoennea subcylindrica, Peile, Proc. Malac. Soc., XVIII, 1929, p. 270.

Bukit Pondong, Perak.

**Indoennea ridleyi* Peile.

Indoennea ridleyi, Peile, Proc. Malac. Soc., XVII, 1926, fig.

Id. op. cit., XVIII, 1928, pp. 153–154, fig. 5. Abundant in the Batu Cave, and Gua Tembus, Selangor.

***Indoennea butleri** Peile.

Indoennea butleri, Peile, Proc. Malac. Soc., XVIII, 1929,
pp. 153-154, fig. 1-1a.

Batu Cave, Selangor.

(See Peile's remarks under his reference to *subcylindrica*).

***Ennea bicolor** Hutton.†

An introduced species which is well established in various parts of the Peninsula

de Morgan records it from Penang, and I have seen specimens from Selangor.

The species is found also in India and in the Mascarene Islands.
Streptaxis.

As the subdivision of the genus does not seem to me to be in a satisfactory state I prefer to include all the species under the one heading *Streptaxis*. When better known they will prove to be more suitably arranged under several generic names.

See Kobelt, in Martin and Chemnitz, Conch.-Cab., I Bd., XII, Abth. B., 2 Th., 1906, p. 99 seq.

Also Gude's Synopsis of the genus should be consulted. Gude, Proc. Malac. Soc.

The genus, like its near ally *Ennea*, includes carnivorous species, with large, sickle-shaped teeth on the radula.

The shells of both genera are glassy-white. In *Streptaxis* the shell is helicoid, and the last whorl or so is excentric, whilst the species of *Ennea* have always a pupiform shell.

Streptaxis mirificus Mlldff.

Samui Islands.

Streptaxis collingei Sykes.**Streptaxis siamensis** Pfr. v. *depressa* Mlldff.

Samui Is.

Streptaxis bulbulus Morelet.

Samui Is.

Streptaxis strangulatus Mlldff.

Samui Is.

Streptaxis roebelini Mlldff.

Samui Is.

Streptaxis plussensis de Morgan.

Perak.

Streptaxis sykesi Collinge.

Biserat in Jalor.

***Streptaxis nummus** Laidlaw.

Odontartemon (Discartemon) nummus, Laidlaw, Proc. Malac. Soc., XVIII, pp. 259-260, fig. 1.
Singgora.

NOTE.—

By an error which I regret I find that I have transposed the two species *Dyakia hugonis* Pfr. and *D. sannio* Pfr. both above and in my paper in the Proceedings of the Malacological Society of London, xix, 1931, p. 190 seq. 'On a new sub-family Dyakiinae.'

The species from Pulau Aor is *sannio* Pfr. and *hugonis* Pfr. does not occur on that island or in the Peninsula so far as I know.

Kintana de Morgan does come very near *hugonis* and is scarcely separable from *janus*, so that it remains true that these forms tend to grade into each other. Anatomically *sannio* and *hugonis* are of course extremely similar.

Journal, vol. X, Part III, 1932.

CORRIGENDA.

Preface. For *J. D. Hughes* read *T. D. Hughes*

- p. 5, ll. 10-11, for *lived an Indian Buddhist who possessed an armillary sphere* read *were Indian Buddhists who erected a stone to the illustrious feet of Gautama whom Mahayanists identify with the universe* (lit. *armillary sphere*) and add a footnote "Vide Kern, Notulen Bat. Gen. 1888, p. 155 and Kern's Verspreide Geschriften VII, pp. 141-2."
- p. 17, 1.16, for *rivetted* read *revetted*.
- p. 18, note, for *Sausa* read *Sousa*.
- p. 19, 1.12, for *Malacca* read *Malabar*.
- p. 31 (bottom); for 1911 read 1611 & for 1912 read 1612.
- p. 38, l. 42 delete *and so, probably,* *Ulu Pahang (or the Temerloh region) ceased for ever to be one of the Negri Sembilan.*
- p. 39, *note*, for 1862 read 1682.
- p. 47, 1.23 delete (? *Bendahara*).
- p. 62, 1.24 for *figures* read *figure*.
- p. 65, 1.4 delete (? *Daing Kechil*).

- p. 94, third paragraph l. 2, after *difficulties add on 3 December 1856 the Governor regretted he could not allow fifty of the Temenggong's followers to go armed in Singapore.*
- p. 98 l. 13 for *Mutahir* read *'Ali*.
- p. 100 ll. 32, 33 for 1847 read 1858 and for *Koris* read *Tahir*.
- p. 134, for *D. Kechil* (a) *Tem.*, *'Abdu'l-Hamid* read *D. Kechil* (a), *Tun 'Abdu'l-Hamid*.
- p. 148, 11.35-40 delete and read *This refers to Tun 'Abdu'l-Jamal who succeeded 'Abdu'l-Majid as Temenggong.*
- PP. 148, 150. On 20 Sha'ban 1160 A.D. (18 July 1747) Sultan Sulaiman and Bendahara Tan Hussan (= Tun Husain) made a treaty with William Decker on behalf of the Dutch East India Company as to rewards for the apprehension of slaves absconding by sea—to Linggi, Ayer Hitam, Jugra, Klang, Selangor, Muar, Padang, Batu Pahat and Pontian. Again at the house of the same Bendahara, in Malacca, Sultan Sulaiman decreed for the Dato' Kapitan (*i.e.* of the Malays) the fine for incivility to Penghulus. Tun Husain also laid down the qualifications for Malay headmen. And he paid the marriage price for the daughters of manumitted slaves, adding to the law promulgated "by the Sultan, Mangkat di-julang, after him, the Yang di-pertuan Besar, called Mangkat di-kayu anak, who followed the '*adat* of Sultan Mahmud Shah, King of Malacca." Newbold's *British Settlements in the Straits of Malacca*, vol. II, pp. 272-3, 276, 285, 289.
- p. 150, for *Tun 'Abdu'l-Jamal*, *Tem.* (? *P.R.* ca. 1760-7) read *Tun 'Abdu'l-Jamal*, *Tem.* *P.R.* ca. 1760.
For *Daing Kechil*, *Temenggong* (? not installed) read *Daing Kechil*.
Add XIII *Bendahara Tahir* d. 1863 as elder brother of *Sultan Ahmad of Pahang*.
- p. 159 for *Plate II* read *Plate III*.
For هذل القبر المثور والمرقد read *This is the gleaming grave and the pure sleeping-place of the Sultan, etc.*
and translate: *This is the gleaming grave and the pure sleeping-place of the Sultan, etc.*
- For سلام الله يامرحوم ولها صفيها ملائكة خيره ونوره read *May God fill his grave with gleam and light.*
and translate *May God fill his grave with gleam and light.*
- p. 166, 1.28 for *XXII* read *XXXII* and for *XXXII* read *XXXI*.
- p. 167 Plate *XXXIII*, for *The reverse of the same stone read Inscription on the footstone of the same grave.*

TRIASSIC WOOD FROM THE MALAY STATES.

By W. N. EDWARDS.

(Published by permission of the Trustees of the British Museum).

(Plates XI—XII).

For the material described here I am indebted to Mr. J. B. Scrivenor, late Director of the Federated Malay States Geological Survey, who has furnished the particulars of its occurrence, and has presented the specimens to the British Museum (Natural History). They are from two different localities, but Mr. Scrivenor considers the age in each case to be probably Triassic. For the Kelantan fossil wood this has already been recorded by Mr. Scrivenor in the "Geology of Malaya," 1931, p. 68.

i. *Dadoxylon sclerosum* Walton.

(Pl. XI, figs. 1–3; Pl. XII).

This species is represented by a fine portion of a silicified log, about 32 cm. in diameter and about 22 cm. in height. It was found on a rubber estate at Jerantut, Pahang, by Mr. E. S. Willbourn. In the opinion of Mr. Scrivenor it was weathered out of arenaceous beds overlying andesite.

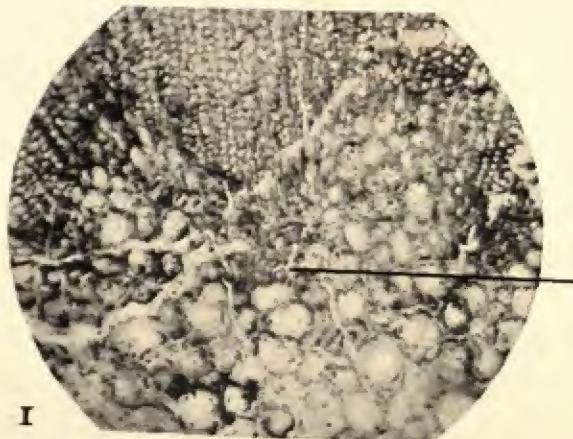
Whereas so many fossil coniferous woods consist merely of secondary xylem, this specimen is of particular interest, especially in view of its presumed age, since it includes the pith and primary xylem. The preservation at the centre of the stem is not perfect, and the presence of a mass of chalcedonic quartz radiating into cracks in the secondary xylem gives the pith an apparent diameter of 1–2 cm. A microscopic examination, however, suggests that the true diameter of the pith was probably at most a few millimetres. The distinguishable characters of the stem may be summarized as follows:

The *pith* consists of large, round, parenchymatous cells, and contains, near the periphery and opposite the apices of some of the xylem wedges, a few groups of smaller and rather thick-walled cells.

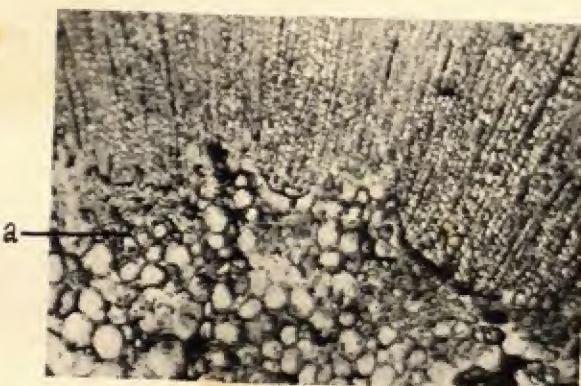
The *xylem* appears to be entirely centripetal. Growth-rings are almost absent, but can be faintly seen in some sections taken from the outer part of the trunk. Parenchyma and resin canals are absent.

The *tracheids* have bordered pits on the radial walls which are usually in one row, in contact, and sometimes compressed. The preservation is poor, but sometimes the pits definitely appear to be separate. Very rarely they are in two rows and hexagonally

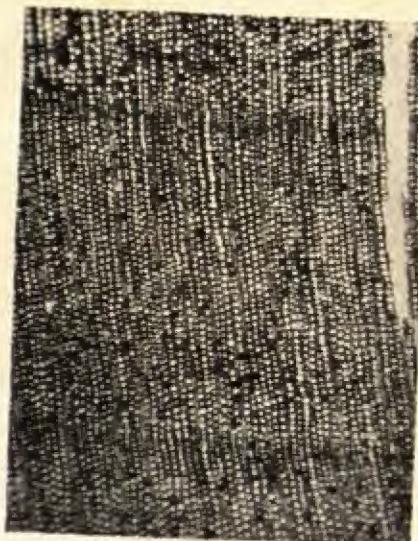
JOURNAL MALAYAN BRANCH, ROYAL ASIATIC SOC., VOL. XI. 1933.



I



2



3

Dadoxylon Sclerosum from Pahang, Malay Peninsula.

compressed. The tangential walls are unpitted. There are also spiral markings due to decay. The diameter of the larger tracheids is about 50μ .

The rays are uniseriate, one to about 20 cells in height. The field pitting is obscure; there are perhaps 2-4 pits in the field. The tangential width of the ray cells is frequently about 20μ , but may be as much as 35μ .

Identification:—On the characters of the rather poorly preserved xylem alone, such a wood might be regarded as unidentifiable. The presence of groups of small thick-walled cells in the pith, however, at once suggests a comparison with a South African wood described by Walton (1925) as *Dadoxylon sclerosum*. In both cases the preservation of the pith and perimedullary region is not very good, but the groups of cells in the Malay wood certainly seem comparable with the groups of sclereids described by Walton. Unfortunately, none of the longitudinal sections of the Malay wood passed through any of these groups, so that one cannot be absolutely certain that they were composed of elongated sclereids. Their position, however, is significant, and most of the other characters of the wood agree closely with those of Walton's species.

Two differences, which are probably not of systematic importance, may be noted. In the South African wood the annual rings are distinctly marked, and the bordered pits on the radial walls of the tracheids are more frequently biserrate. *Dadoxylon sclerosum* has been recorded and very clearly figured by Williams (1930) from Kenya, and it is of interest to note that, in his material, growth rings are almost completely absent, and the pits on the radial walls of the tracheids are usually uniseriate. In discussing the absence of growth rings, Williams rightly concludes that "it is doubtful whether this character is sufficient to justify specific separation and it seems better to include the Kenya material in Walton's species." It is not certain (owing to the state of preservation) whether the Malay specimen had so many groups of sclereids as the Kenya wood, in which there are about 22, but otherwise these two woods appear to have been very much alike.

Future work may suggest that the structure of the pith is a diagnostic character of sufficient value to warrant generic separation from the comprehensive form-genus *Dadoxylon*, and, with more abundant material from different localities and different parts of the same plant, it might be possible to decide whether or not the minor differences noted above are constant specific characters. Meanwhile I propose to include the Malay specimen in *Dadoxylon sclerosum* Walton.

Locality:—Jerantut, Pahang, Federated Malay States.

Horizon:—Mr. J. B. Scrivenor believes that the beds in which the trunk occurred are of Triassic age. Walton gives the horizon of the South African (Cape Province) wood as "top of Molteno beds or possibly higher." Du Toit has shown that the Molteno beds must be referred to the Upper Triassic, and as the overlying Red Beds and Cave Sandstone contain Upper Triassic vertebrates, the type specimen of *D. sclerosum* may be regarded as probably of Upper Triassic or possibly Rhaetic age.

Williams does not deal with the age of the Kenya material, but from an accompanying paper by Miss McKinnon Wood (1930) it appears that the *D. sclerosum* must have come from the Mazetis Sandstone, which is one of the upper members of the Duruma Sandstone, and underlies lower Jurassic beds, though the exact relations are uncertain. One of the lower members of the Duruma series, the Maji ya Chunvi Beds, is regarded as being Lower Triassic. It would therefore seem to be consistent with the present evidence to consider the beds yielding *D. sclerosum* in Kenya as probably of Upper Triassic or Rhaetic age.

Pending further information as to the vertical range of the *D. sclerosum* type of wood, one can at least say that Mr. Scrivenor's estimate of the age of the Jerantut trunk is confirmed by a microscopical examination of the wood, and that an Upper Triassic age is suggested.

ii. *Dadoxylon* sp.

(Text-fig. 1).

Description:—Several pieces of dense black secondary wood, possibly all from one trunk, without any pith or primary xylem. The preservation of the pits on the tracheid walls and in the field is fairly good in parts; certainly better than in *D. sclerosum* described above. In patches the tissues are entirely filled with pyrites.

Growth rings are apparently absent, and there are no resin canals nor parenchyma. In radial section the tracheids are sometimes as much as 70μ in diameter. The bordered pits are in 1—4 rows (usually 2 or 3), usually in contact and alternating, but only occasionally hexagonally compressed. When uniseriate they are frequently compressed. The tangential walls of the tracheids are unpitted. There are 1—6 field-pits, which are not very well preserved, but appear to be sometimes circular, and

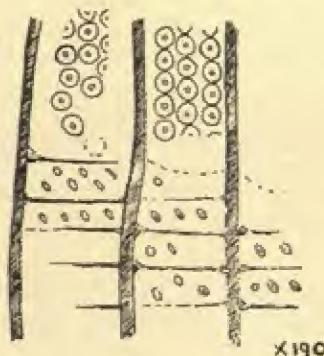
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Silicified Log from Pahang, Malay Peninsula.

sometimes elliptical to oblique. The rays are uniseriate, 1—40 cells high, and the tangential width of the cells is usually less than 20μ .

TEXT-FIG. 1. *Dadoxylon* sp. from Kelantan. Radial section showing field-pitting of medullary rays. The bordered pits on the tracheids are usually in contact. B.M.N.H., no. V. 21465e. $\times 190$.



Comparison with other woods:—The characters of the secondary wood differ markedly from those of the Jerantut tree, and it does not seem possible to include both in the same species. Nor can this Malay wood be referred to *Dadoxylon arberi*, in which the pits are frequently separate or in scattered groups, nor to the Indian species described by Holden (*D. indicum* and *D. bengalense*). These three species are definitely Permian, so far as is known at present; of somewhat later woods, *D. australe* (Crie, 1889) from the Triassic of New Caledonia is inadequately described and figured, but differs at any rate in the presence of well-marked annual rings and the much lower rays, as well as apparently in the more frequently hexagonal pits. The Indian Jurassic *D. rajmahalense* Sahni (1931) also has well-marked growth rings and differs in several minor points. Another Indian wood, from the Maleri stage (which may be Rhaetic), described but not named by Sahni (1931) p. 71, seems to have a similar structure, but is not sufficiently well preserved for exact comparison. In certain respects the Malay wood resembles some of the unnamed specimens of *Dadoxylon* described by Williams (1930) from Kenya, but in no case can identity be assumed. In view of the imperfect state of the Malay wood and the absence of any very distinctive features, it does not seem advisable to create a new name for it, and it affords no definite evidence for the age of the strata in which it occurs.

Locality:—"On the Sungai Tranang in the Ulu of the Nenggeri River," Kelantan, Malaya.

Horizon:—Believed to be Triassic.

iii. *Summary.*

Very few plant fossils have been recorded from the Malay States, but some specimens of *Pecopteris* and *Cordaites* from the Raub series of Kelantan (Edwards 1926) suggested that in Stephanian times the flora of Malaya was related to the northern rather than the southern type of Permo-Carboniferous vegetation. A more extensive Stephanian or Lower Permian flora of the northern type had already been found in Sumatra. The subsequent discovery by Lightfoot (Walton 1929) of pecopterids associated with *Glossopteris* in Rhodesia shows that some northern types had penetrated far into that part of Gondwanaland, and opens the question as to whether the connexion may have been by way of the East Indies and Malaya. Further evidence is at present lacking, but whatever may have been the case in Permo-Carboniferous times, the present record of *Dadoxylon sclerosum* in Malaya seems to indicate a relationship with East and South Africa in the Upper Triassic.

The feeble development or apparent absence of growth rings in the Malayan species of *Dadoxylon* must not be too highly stressed, but it is of interest to note that in South Africa these woods have strongly marked rings, while in the intermediate East African region, according to Williams, the rings are fairly well marked in some, and faint in others. It is possible that these differences may be a reflection of differing climatic conditions.

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Explanation of Plate XI.

- FIG. 1. *Dadoxylon sclerosum* Walton, from Jerantut, Pahang, F.M.S. Transverse section in the region of the pith, with group of thick walled cells at *a*. B.M.N.H., no. V. 21464d. x 60.
- FIG. 2. The same. No. V. 21464g. x 34.
- FIG. 3. The same. Transverse section in the outer part of the wood, showing faintly marked rings which may not be true growth rings. No. V. 21464a. x 18.

GANTANG OF KELANTAN.

By ANKER RENTSE.

(Plate XV).

For visitors to the local market it is interesting to watch the rice-sellers. One cannot but admire the deftness and dexterity with which they fill their *gantang* measures and empty the contents into the buyer's basket or bag. The more skilled they are in measuring, the bigger profit they obtain. When filling his *gantang* or *chupak* with rice the seller will hold it in a sloping position, so that the measure will not be full and over-flowing and will thus save a handful of rice at each operation. Careless buyers will then find on their return home, that the contents of their bag of rice is appreciably less than what it should be. In this way the rice-dealer is often able to turn a dishonest cent in spite of the standardization of his measures.

It appears from inscriptions on the old *gantangs* described below, that the past rulers of Kelantan fully realized the necessity of protecting buyers by introducing standard rice measures. The *gantang* used when Kelantan was under the Siamese Protectorate was smaller than the present one, which is equal to one gallon (1 gallon = 1 *gantang* — 4 *chupak* — 8 *ling*). Skeat and Blagden remark, that "a *gantang* is a dry measure, varying much according to locality, but roughly corresponding to a gallon."*. Even in the same locality the *gantang* varied from time to time.

Pl. XV. fig. 3 shows an old *gantang* which was presented to me some time ago. It was found near the mouth of the Sokor river in Ulu Kelantan. The Sokor is a tributary of the Kelantan river. It is situated about 50 miles from the coast. Though the banks of this river are now uninhabited (except by wandering Semangs) I have been told by local Malays, that in times past there was a big settlement near the Kuala Sokor, traces of which have now disappeared in the jungle. This *gantang* is made of bronze of a kind somewhat similar to that of the old Kelantan gongs. Two holes on the side indicate traces of a handle, which has disappeared. Part of the inscription on the side was found to be unreadable owing to decay and poor craftsmanship.

By the kind assistance of Mr. W. Linehan, Assistant British Adviser, Kelantan, I am able to decipher part of this inscription as follows: *Ini-lah gantang (perbelanjaan?) sukatian (Sultan al-adil?).....1222.....* The reading *perbelanjaan sukatian* is not out of place when it is considered, that rice must have been a medium of exchange or form of currency in Kelantan in the past, as it still is in the more remote parts of the country. We may translate the expression "a currency and measure." It is remarkable what a variety of objects have

* "Pagan Races of Malay Peninsula" (1906).

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Rentse: Rice measures from Kelantan.

been used in the past in various countries as a circulating medium:—Skins amongst Red Indian tribes, cattle amongst pastoral people (the Latin word for money *pecunia* from *pecus* affords evidence of the earliest Roman money being composed of cattle), corn and maize amongst agricultural people. Tobacco was adopted as legal tender by the colonists of North America. Rice, fowls, jungle produce and ghee are sometimes still proffered in payment of land rents in Ulu Tembeling. The aborigines of the Jelai Kechil pay tribute to the Dato' Maharaja Perba in rice and fowl. The inscription on the *gantang* may thus be translated as follows: "This is a Gantang, a currency and measure (approved by) Sultan the Just.....1222 (A.H.).....," (*i.e.* in 1807 A.D.).

The ruler of Kelantan then was Long Muhammad or Raja Muhammad I (Marhum Mandul), son of Raja Yunus, the progenitor of the present royal family. Raja Muhammad I ascended the throne in 1215 (A.H.) (1800 A.D.) and died in the year 1251 (A.H.) (1835 A.D.). An interesting point, as regards this *gantang* of the year 1222 A.H. is, that Raja Muhammad I during the fights with Trengganu and Patani for the rulership of Kelantan retired for some time to Sukui* or Sokor, the place where the *gantang* was found.

The *gantang* (pl. XV. fig. 3) contains not more than 6.8 pints, or 1.2 pints less than the present standard measure.

The *gantang* (pl. XV. fig. 1) was shown to me by Tengku Besar Tuan Yusuf, who very kindly gave me permission to take a photograph of it. This *gantang* is of a much later date than the former. It is hollowed out of one block of *Chengal* wood and is bound round the rim by a rather beautifully designed brass-band, just underneath which is a small tin plate, the Sultan's *téra* (seal). It is interesting to note, that the Rajas used to place their seals on the top of the *gantang* (and the *chupak* too) in order that any "clipping" of the measures by unscrupulous persons would readily be detected.

The inscription on this *téra* was too decayed to be readable. It appeared to be in Arabic. The year was, however, quite clear, 1269 (A.H.) (1852 A.D.). At that time Sultan Muhammad II (Sultan Mulut Merah) was the ruler of Kelantan (1251—1304 A.H.; 1835—1886 A.D.), successor of Muhammad I, who died childless (Marhum Mandul).

This *gantang* contains only 6.6 pints, or 1.4 pints less than the present standard measure.

The *chupak* in pl. XV. fig. 2 was presented to me by Tengku Khalid bin Tengku Bendahara. It is made out of a coconut-shell.

* Journal Royal Asiatic Society (Malayan Branch), No. 72, May 1916; H. Marriott:—Fragment of History of Trengganu and Kelantan.

The Raja's *tēra* has disappeared, but the place where it was affixed can still be seen. The content of this *chupak* proved to be 1.65 pints or 0.35 pint less than the present *chupak* measure. This *chupak* thus appears to be of the same age as the *gantang* in fig. 1, as its content is $\frac{1}{4}$ of that *gantang*.

Tengku Khalid showed me a tin *gantang* with the Sultan's *tēra* both on top and bottom. It was dated 1319 (A.H. 1901 A.D.) and proved to contain 7 pints or 1 pint less than the present standard measure.

In Kelantan the *gantang* is not only employed as a rice-measure. In certain districts it is in common use for measuring meat, fish, salt, etc. One *gantang* of meat amounts to approximately $5\frac{1}{2}$ —6 catties.

NOTES ON MALAY BELIEFS.

By ANKER RENTSE.

Pusat Tasek.

Pusat Tasek, the centre of the ocean; the great whirlpool in which the giant coconut palm, *Pauh Janggi*, grows. According to R. J. Wilkinson's Dictionary (Singapore, 1903):—"Pauh Janggi: *janggi* (Persian, *sangi*). African; Ethiopian; negro; connected with East Coast of Africa; an adjective of remote or fabulous origin.

Pauh janggi; a tree to grow on a sunken bank, *tebing runtuh*, in the centre of the ocean, guarded by dragons, possibly a tradition of the *Cocos maldiva*: (Hk. Raj. Don., 31)."

From Ulu Kelantan:—

Shurga, Heaven, is on the top of Pauh Janggi, and Nuraka, Hell, is down below its roots. A gigantic hole between the roots causes the ocean water to disappear into hell's big boiling-pot, *kawah nuraka*, whence the whirl-pool. Underneath the pot burns everlasting fire. A dragon guards the hole, the gate to hell (*pintu nuraka*) with its body in order to prevent the ocean from running dry.

In *Pusat Tasek* an account is kept of the good and the bad deeds of every human being in the world. The accountant in Heaven is Ka' Tebir, and in Hell, Kiraman. The last one is said to be so busy on occasions, that he gets angry, throws his pen on the floor and declares, *Ini sekarang sudah chukup!* 'This is rather too much.'

The dragon is supposed to be in possession of certain *guliga* or bezoar stones with magic properties. According to a legend of the Kelantan shadow play (*Wayang kulit*) Princess Siti Dewi, the consort of Raja Seri Rama sent Hanuman Ikan to borrow one of these bezoar stones as a cure for a poisonous snake bite.

It is believed, that during the big flood in Kelantan in 1926, a cave of the dragons on a mountain in Ulu Kelantan opened its gate (a landslide?), and a giant dragon forced its way through the jungle and plunged into the Galas River following the floods down to Kuala Pergau. Its scales were of gold. At Kuala Pergau it collided with another dragon coming down the Pergau River. At the collision the two turned into one; but the scales of the latter were of silver. This dragon collided with a third one at Kuala Lebir, and here again the two turned into one; but the scales of this were of steel. This dragon was carried by the current out into the ocean in order to relieve its brother at *Pusat Tasek* as a guardian of the gate of Hell, where work in those days was expected to be too onerous for one!

The big Python snake, which has got two small claws one on each side of the anus, is believed to turn into a dragon when full grown. The claws are said to develop into the hindlegs of a dragon.

According to Owen Rutter: "The Dragon of Kinabalu." (Clement Ingleby, London), p. 19, the Geruda, the fabulous bird of Vishnu, lives in the top of Pauh Janggi.

From the Kelantan Shadow Play (Wayang-kulit):—

Raja Iskandar (Alexander the Great) intended to go to China to marry the Emperor's daughter. When the Geruda bird heard the news, it went to King Solomon (Nabi Sulaiman) and told him. King Solomon was disgusted by the idea of a Muslim prince marrying an infidel and ordered the Geruda to prevent it. So, when Raja Iskandar was on his way to China, the Geruda bird raised a storm, which wrecked the ship. All were drowned except Raja Iskandar, whom the Geruda seized in its claws and brought to Pusat Tasek, where it placed him in a box and threw him into the whirlpool, so that he might disappear down below. However, the ocean current carried the box away from the whirlpool and landed it on the coast of China, where Raja Iskandar married the Emperor's daughter. King Solomon, furious when he heard of the marriage, condemned the Geruda bird to remain on the mountain Kaf (Caucasus) at the end of the world for ever.

In JRASSB. 72, May 1916, is printed the Hikayat Marong Maha Wangsa, by A. J. Sturrock, where p. 37, an account is to be found of the Geruda bird carrying away *anak raja Rum*. Another reference is to *Great Short Stories of the World* (William Heineman, London, 1927, p. 84) Persian tales; The Sailor and the Pearl Merchant, translated by Reuben Levy, M.A., from MS. Ouseley 231, Bodleian Library (Oxford University Press). This tale relates how the sailor during his adventures came to a spot on the sea, a long way off looking like a minaret, but really a high mountain, at the foot of which was a great whirlpool dragging ships down to the bottom of the sea. The sailor managed to save himself and get up to the top of the mountain, where he found a tablet and a drum. The drum was made of Damascus bronze and covered with lion skin. An inscription on the tablet told him, that Alexander the Great reached the Lion's Mouth, as the place was called, on his travels round the world, and as he was aware of the danger there beforehand, he brought along with him 4000 wise men. Plato, being one of those, ordered the drum to be made, and when it had been struck thrice, the ship came back to the surface again.

Reference.—R. J. Wilkinson. Journ. Malay. Branch Roy. Asiatic Soc. X, 1932.

Kandang Balok.

Kandang Balok, "the fold of the tigers," a place on a mountain in the jungle, where the tigers are ruled by their king.

W. Skeat, "Fables and Folktales from an Eastern Forest" (Cambridge University Press, 1901), p. 26: The Tigers' Fold. It is here related how a sorcerer in a trance was seized by his tiger-chief and brought to the tigers' fold and kept safe for the tigers in the chief's own house, where the prowling beasts did not dare to attack him. Afterwards he managed to escape home, where he told his family about his adventures.

The following tale, told me by an old medicineman, To' Mat Sah, who is of Semang origin, gives a detailed description of this belief in Ulu Kelantan among the forest people.

Kandang Balok is the home of the tigers. It is said to be situated on Gunong Ledang in Ulu Kemaman (according to To' Mat Sah). Here rules Dato' Uban (the greyhaired chief), who is the tiger king. He lives in a palace built of human bones, the roof whereof is thatched with human hair. In their own country the tigers walk about like human beings; but when leaving their place for hunting, they pass through a bamboo tunnel underneath Sungai Putih (the White River), whereby they attain the shape of tigers. Returning through the tunnel back to Kandang Balok they regain their human shape.

Once there was a Bomor Belian (the medicineman, who exorcises the tiger spirit, *kantu belian*) in Ulu Kelantan named Sadinda, who treated a sick person with a certain kind of medicine. The latter was, however, only partially cured, wherefore he promised Sadinda, that he would prepare a feast consisting of *Ayer serbat* (sweet water) and *Lemang Pulut* (glutinous rice cooked in coconut juice in a bamboo vessel), if Sadinda would invoke the tiger spirit to complete the cure. Sadinda agreed. A shelter was erected, the roof seven feet above the ground and thatched with scented leaves, such as *Kupen besi*, *degong*, *lerek*, *tebu*, *chalong*, *chandes* and *palas hutan*. The ground beneath was covered with the same kind of leaves for the sick person to lie on. At night Sadinda commenced a *Main Bangsi* seance. Sadinda himself played the *bangsi*, a Semang noseflute, and all the people of the tribe were seated around the shelter, singing and playing the *chantong* together with Pe' Ginding (apparently To' Mindok), who played the *buluh kerong*. The sick person lay in the middle beneath the shelter with a poultice made of a kind of flour on his forehead.

Bangsi:—A Semang noseflute about 26 inches long. The word *bangsi* not common in Ulu Kelantan, where the Malays use a shorter bamboo flute called *seredam*. The word *bangsi* is probably Pahang Malay (To' Mat Sah came from Ulu Pahang). According to Skeat and Blagden the Semang words for a bamboo noseflute are *pensol*, *penbok* and *penyoign*.

Chantong:—Bamboo pounders; each person carries two, one in each hand; when pounded on a piece of wood they make different sounds.

Buluh kerong:—A stringed bamboo guitar. Semang: *kerontong* or *keranting*.—Skeat and Blagden; Ulu Kelantan Malay *Gendang batak*. On the last mentioned the strings are cut out of the bamboo and kept away from its body by small pieces of wood: the end of the strings are still fastened and to part of the body. This instrument is in use among Malays in Ulu Kelantan, and is similar to that shown on the drawing of a Mantra guitar, Skeat and Blagden, Pagan Races of the Malay Peninsula, Vol. II, p. 145, except for the strings, which appear to be of some foreign material.

The performance went on till late in the night, when Sadinda succeeded in invoking the tiger spirit, which took possession of his body. He danced around the sick man playing the noseflute, with which he finally blew the man's sickness out through the poultice on his forehead. After seven days the tiger spirit returned in the shape of a tiger and demanded the feast proffered. Nothing was ready, however, as all their rice had been eaten, and none of them had been able to procure a new stock.

"What is the use of me becoming a medicineman here, if you do not pay your fee?" roared the tiger angrily, "I shall certainly take Sadinda along with me back to Kandang Balok."

At which he seized Sadinda, slung him on to his back and disappeared into the jungle.

When they went through the bamboo tunnel underneath the White River, the tiger assumed the form of a human being, and both entered Kandang Balok and were admitted before To' Ubah, the king of tigers. He received them well and gave Sadinda a beautiful princess of the tiger folk, his own cousin, to marry, and Sadinda's name was changed to Hulubalang Bongsu (the youngest warrior). In time they got a son, Hulubalang Kilat (the lightning warrior). But as time went on Hulubalang Bongsu conceived a growing longing for his wife and son in Kelantan, and one day he went up to the king of Tigers, and said:

"Pardon Dato', your slave craves permission to go back to Kelantan for a short while to see his wife and son."

"Well! my brother," answered the king, "you shall be allowed to do so; but do not remain in Kelantan for more than seven days."

The king gave him two of his warriors as an escort, Hulubalang Rebong (the Warrior of the young Bamboo-shoots) and Hulubalang Lentang Dendang (the Warrior with the deep Booming and Droning Sound of a tiger), whereupon Sadinda went and told his wife, the tiger princess, about his intention, at which she remarked:—

"My friend intends to return to Kelantan for seven days? Well! do not be away long. Take this Bezoar stone (*guliga*), and

when you arrive near your *kampong*, leave it on the ground, you will then be turned into a human shape and thus be able to enter your house. Furthermore take this egg, and take great care, that it is not crushed; if it is crushed you can never again return to Kandang Balok."

He then took leave of his wife and his son and departed with his two followers. When passing underneath the White River they assumed the shape of tigers, and in a straight line they went for Kelantan. Arriving they came to a Chinese clearing, where there were seven pigs. Being hungry they attacked and killed one of them; but the Chinaman, hearing the noise, jumped out of the hut and threw his spear at the tigers. This hit Hulubalang Bongsu in the flank, and jumping and gasping from pain, he crushed the egg, which he carried in his mouth.

The two other tigers roared in horror: "Hulubalang Bongsu is dead! the egg has been crushed."

As quick as lightning they tore a piece of skin out of the dead pig and put it into the wound, which healed at once. But where the wound had been there remained a bare spot without any hairs, and everybody can see, that it was the skin of a pig. That tiger was seen by many jungle folk in Ulu Kelantan.

Hulubalang Rebong and Hulubalang Lentang Dendang now took leave and returned to Kandang Balok; but Sadinda, still in the shape of a tiger, went along to his *kampong*, where he left the bezoar stone in the jungle nearby, and, resuming human shape entered his house, where he was well received by his people.

Some time afterwards Sadinda fell ill and died; and shortly after this a young tiger took up his abode in the surrounding jungle. One evening he entered Sadinda's house in human shape and knocked at the door.

"Who is there?" asked Sadinda's son from inside.

"It is your younger brother," answered the voice outside the door. It was Hulubalang Kilat.

"I wish to see my father," said Hulubalang Kilat.

"Your father is dead," answered the elder brother.

On hearing this Hulubalang Kilat returned to the jungle and disappeared for ever.

OMENS.

The following description of Omens was given to me in Jawi writing by Che Ahmad, Kota Baharu.

Fasal pada menyatakan pelangkahan hari kita hendak berjalan.

Bermula jika pada hari abad mara-nya di-bumi nahas malam, jika berjalan pagi-pagi 'alamat rugi, jika tengah tulih akan bertemu dengan keluarga, jika tengah hari akan beroleh rosak, jika dzohor akan bertemu dengan adek-kakak yang kaya, jika asar

akan beroleh laba, jika petang malam akan berseteru; jika menghadap Raja-Raja pada hari itu hendak-lah kita ka-timor laut.

Pada hari ithnin-mara-nya di-jalan pagi-pagi kita berjalan beroleh rosak, jika di-tengah-naik akan beroleh rosak, jika di-tengah tulih akan beroleh laba banyak, jika di-tengah hari akan bertemu dengan seteru, jika di-dzohor akan beroleh laba mas dan perak, jika asar akan bertemu dengan adek kakak, jika petang malam akan beroleh laba yang baik; jika menghadap Raja-Raja atau Mentrei baik.

Pada hari thalatha jika berjalan pagi-pagi tiada baik, jika tengah naik kita berjalan akan bertemu dengan seteru, jika tulihan akan beroleh laba, jika tengah hari akan membuang ayer mata, jika dzohor akan beroleh laba, jika petang malam akan beroleh laba benda yang baik; jika menghadap Raja-Raja pada hari itu hendak-lah kita hadap ka-tenggara.

Pada hari rabu mara-nya di-dusun, jika pagi kita berjalan akan bertemu dengan perempuan, jika tengah naik akan beroleh laba, jika tulihan akan beroleh laba-sa-suatu dengan adek-kakak, jika tengah hari alamat membuang ayer mata, jika asar akan beroleh laba, jika petang dan malam akan beroleh makanan; jika menghadap Raja-Raja menghadap kita selatan.

Pada hari khamis jika pagi-pagi kita berjalan beroleh laba tetapi hilang pula, jika tengah naik bertemu dengan seteru, jika tulihan akan beroleh benda yang baik, jika dzohor akan beroleh rosak, jika asar akan bertemu dengan adek-kakak; jika menghadap Raja-Raja hadap kita ka-barat-daya.

Pada hari juma'at jika pagi-pagi kita berjalan baik, jika tengah naik akan bertemu dengan adek-kakak, jika asar akan bertemu benda yang baik, jika petang dan malam akan membuang benda yang baik; jika menghadap Raja-Raja hadap kita ka-barat laut.

Pada hari sabtu pagi-pagi kita berjalan beroleh kata-kata yang jahat, jika tengah naik beroleh laba, jika tulihan akan bertemu dengan seteru, jika tengah hari alamat membuang ayer mata, jika di-dzohor beroleh laba, jika petang dan malam jahat; jika menghadap Raja-Raja hadap kita ka-tenggara. Tamat!

Jika pada hari sabtu dan hari abad pagi-pagi menghadap tenggara, jika pada hari ithnin dan hari thalatha pagi-pagi menghadap ka-timor-jati, jika pada hari rabu dan hari khamis pagi-pagi menghadap ka-selatan, jika hari juma'at pagi-pagi menghadap ka-barat, ini-lah ingatkan supaya tiada bermara pekerjaan kita karna pakaian hulubalang turun-temurun daripada 'Ali.

Translation:

On Omens governing the days of our journeyings.

First on Sunday there is danger from the earth and misfortune at night, if we go for a walk in the morning it means loss, if between 8—9 a.m. we shall meet relations, if at noon it means ruin,

if at noon praying time (1 p.m.) we shall meet prosperous sisters and brothers, if at afternoon praying time (4 p.m.) it is a sign of profit, if between 5—6 p.m. we shall make enemies; if we desire audience of rajas on this day, we shall have to face the northeast.

On Monday there are dangers for travellers: in the early morning, we shall incur ruin, if about 7.30 a.m. we face ruin too; if between 8—9 a.m. we shall obtain a lot of profit, if at noon we shall meet an enemy, if at noon praying time we shall obtain profit of gold and silver, if at afternoon praying time we shall meet our younger sister (or brother), if between 5—6 p.m. good profit will be obtained; it is a good sign to meet nobleman or minister.

On Tuesday it is bad to walk out in the early morning; if we go out for a walk about 7.30 a.m. it will be towards an enemy, if about 9.30 a.m. it means profit, if at noon we shall have to shed tears, if at noon praying time it is towards profit, if between 5—6 p.m. it means profit in valuable goods; if we desire audience of a Raja on this day, we shall have to face the southeast.

On Wednesday there is danger in orchards, if we walk out in the morning, we shall meet a woman, if about 7.30 a.m. it means towards profit, if about 9.30 a.m. it is towards profit for both our younger sister (or brother) and ourself, if in the afternoon or evening we shall obtain a meal; if we desire audience of a raja, we must face south.

If we go out for a walk on Thursday in the early morning, we shall obtain profit, which will be lost again; if about 7.30 a.m. we shall meet our enemy, if about 9.30 a.m. we shall obtain valuable goods, if at noon praying time it means towards ruin, if at afternoon praying time we shall meet our younger sister (or brother); if we desire audience of a raja, we have to face the southwest.

If we go out for a walk early on Friday morning, it is good, if about 7.30 a.m. we shall meet our younger sister (or brother), if at afternoon praying time it means towards valuable goods, if in the afternoon and evening we shall lose valuable goods; if we desire audience of a raja, we have to face the northwest.

If we go out for a walk early on Saturday morning some people will talk scandal about us, if about 7.30 a.m. profit will be obtained, if about 9.30 a.m. we shall meet an enemy, if about noon it will be a sign of shedding tears, if at noon praying time we shall obtain profit, if in the afternoon and evening it will be a bad omen; if we desire audience of a raja, we shall have to face southeast. Here it ends.

Face southeast early on Saturday and Sunday, face east-north-east, early on the mornings of Monday and Tuesday, face south early on the mornings of Wednesday and Thursday, face west early on Friday,—remember these rules and misfortune will not dog your labour, for they are rules that have been used by warriors from the time of Ali (son-in-law of the Prophet).

THE POINTS OF THE COMPASS IN KELANTAN.

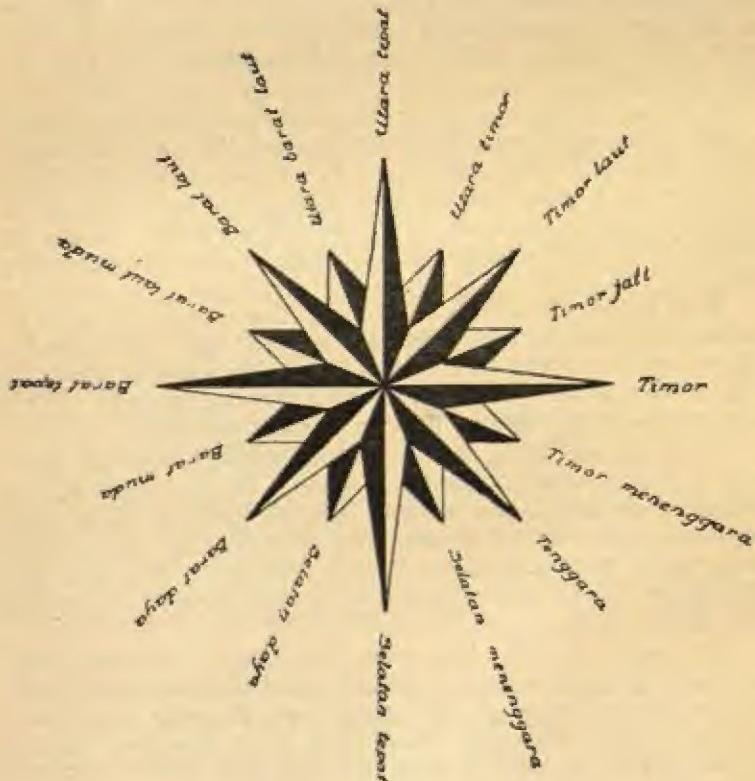
By ANKER RENTSE.

The diagram shown below has been compiled from various sources. Fisher-folk on the coast appear to be familiar only with the names to the North, East and South, many of them seeming to be doubtful as to the minor names of the compass points towards the West.

Another noteworthy point is, that many Ulu Kelantan Malays know only the names that are used by medicinemen in their incantations, i.e.: North = *Hilir bangsawan* (or *besawan*), East = *Sinar naik*, South, = *Hulu bani*, West = *Sinar rundok*.

Furthermore medicinemen make use of Javanese names too:— North = *Lor* (or *long*), *daksina*; East = *Wetan*; South = *Kidot*; *paksina*; West = *Kolong*.

Points of Compass in Kelantan



TRENGGANU ROYAL FAMILY.

By H. P. BRYSON, M.C.S.

On p. 305 of Vol. X, pt. II of this Journal (August 1932) Dr. Winstedt refers to one فیلت or قیلت son of Sultan Mansur of Trengganu. In the State he is referred to as Yam-Tuan Telor on account of an impediment in his speech, so that clearly the *Tuhfat at-Nafis* describes him by the word *pelet* a synonym for *telor*.

Sultan Zainal-Abidin (asc. 1793 d. 1808) is known as *Marhum Masjid* as well as by the name *Marhum Mata Merah* "the deceased who had red eyes." Sultan Ahmad his son is known as *Marhum Parit*. His successor 'Abdu'r-Rahman Shah is called *Marhum Surau*. Sultan Daud who ruled for three weeks in 1831 is called *Marhum Kampong Daik*, Sultan Zainal-Abidin (1881-1918) *Marhum Haji*.

THE ANSWER OF PASAI.

By H. OVERBECK.

We read in chapter XX of the *Séjarah Mélanyu* (Ed. Shellabear, M.L.S., 2nd. ed., Singapore 1909, p. 126) that in the time of Sultan Mansur Shah of Malacca (A.D. 1459-?)¹ a holy man in Mecca, Maulana Abu Isahak, wrote a religious book which he called *Durr al-mandzum* ("Threaded Pearls")². The book consisted of two parts, the one containing a treatise on the nature or essence of God (*dzat*), the other a treatise on the qualities of God (*sifat*). The work being greatly praised by his friends, Maulana Abu Isahak taught and explained his book to one of his pupils, Maulana Abu Bakar, who should proceed to Malacca and carry the book and its doctrine to all people to the leeward of the S. W. Monsoon. On the suggestion of Maulana Abu Bakar the learned author added a third part to his book, containing a treatise on the works of God (*af'al*).³

Maulana Abu Bakar sailed to Malacca, where he and the book were received with great honour, and Sultan Mansur Shah became the pupil of Maulana Abu Bakar. The book was sent also to Pasai

¹ *Papers on Malay Subjects*, History, Part I, pp. 19 & 24.

² This is the title according to Wilkinson, Malay English Dictionary, 1932, part I, p. 291. In the Leiden edition of the S. M. of 1884 as well as in the Singapore edition (in Malay characters, 4th ed., 1921) the title of the book is spelled incorrectly. In his "Critische Beschouwing van de Sadjarah Banten" (Haarlem 1913) Prof. Dr. Hoesein Djajadiningrat says (p. 175) that according to the Leiden edition the book bears the apparently impossible title of "The abode of him who is treated unjustly." Of the spelling in the Singapore edition (in my copy of the 2nd. edition, 1903, it is the same spelling as in the 4th edition) Dr. Pijper, who also pointed out to me the passage in Dr. Hoesein Djajadiningrat's work, gave me the same translation, adding that it is pure nonsense, and that Mr. Wilkinson's title is correct, as the title *Durr al-mandzum* or *Al-Durr al-mandzum* is frequently used in Arabic Literature, generally followed by the word *b* — "about" and the subject of the work.

³ I differ in this translation from Mr. Wilkinson, according to whose Malay-English Dictionary, 1932, the *Durr al-mandzum* was a book with a double interpretation, esoteric and exoteric, whilst the later addition about the *af'al* is mentioned in his Dictionary, but not explained. I take it that *bahasa* is incorrectly transcribed and should be *bahasa*, a corruption of the Arabic word *baith*, meaning a scientific research into, or a learned disputation about. In the Catalogue of the Malay MSS in the Library of the Kon. Bat. Gen. there are several *Durr* with similar contents.—I submitted this question to Dr. Pijper, who agreed with my interpretation, adding that Islamic dogma in the conception of God generally distinguishes between

¹ the essence or nature of God (*dzat*),

² the names of God (*asma'*),

³ the qualities of God (*sifat*),

⁴ the works of God (*af'al*).

A treatise on the names of God has in this case apparently been omitted, either by Maulana Abu Isahak, or by the author of the *Séjarah Mélanyu*.

to Makhdum Patakan⁴ to be interpreted, and was returned to Malacca together with an interpretation, which greatly pleased the Sultan and the Maulana.

Pasai at that time must have been a centre of religious study, and the *Séjarah Mélalu* narrates further:

"Sultan Mansur Shah sent Tun Bija Wangsa to Pasai to submit (to the learned men there) the following question: 'Will the inhabitants of paradise remain in paradise for ever? And will the inhabitants of hell remain in hell for ever?' He took with him seven tahils of golddust and two girls, the one named Dang Bunga, a native of Makassar, the other named Dang Bibah, the daughter of a palace-orderly from Muar. The complimentary gift (accompanying every message) of Sultan Mansur Shah to the King of Pasai consisted of a piece of yellow flowered silk brocade and a piece of purple brocade, a red lory and a brown cockatoo. The Sultan gave Tun Bija Wangsa the order: 'Tun Bija Wangsa, you must ask the learned men of Pasai: Will the inhabitants of paradise remain in paradise for ever, and will the inhabitants of hell remain in hell for ever? Thus you must ask, and whosoever can answer, to him give the seven tahils of gold and the two girls. The answer I wish to have proclaimed by you with drums beating, and to be brought hither.' Tun Bija Wangsa replied respectfully: 'Good, Your Highness.' The letter for Pasai was brought to the ship in procession in accordance with the state-ceremonial, and all the paraphernalia of the procession went with Tun Bija Wangsa. Tun Bija Wangsa then left for Pasai.

"After a sea-voyage of a few days Pasai was reached. The King of Pasai ordered that the letter from Malacca should be fetched and carried in procession with the appropriate insignia and honours. When it had reached the hall of audience, the letter was read, the man who read it wearing the yellow cloth over the shoulder. It ran as follows: 'Greetings and prayers of His Highness the Elder Brother to His Highness our Younger Brother the Séri Sultan, the August, the Revered Ruler, the Shadow of God on Earth. His Highness the Elder Brother has sent his servants Tun Bija Wangsa and Tun Rana to present themselves before your Highness to submit a question for the learned men of Pasai. Our formal gift is a roll of yellow brocade, a roll of purple brocade, a red lory and a brown cockatoo. May they not be despised, as they are a token of sincerity and faith.'

"The King of Pasai was very much pleased with the wording of the letter, and he asked: 'What are the instructions of Our Brother to Tun Bija Wangsa?' Tun Bija Wangsa replied: 'Your

⁴ Who Makhdum Patakan is, neither the *Séjarah Mélalu* nor the *Hikayat Raja-Raja Pasai* explain.

⁵ I have tried to translate the subsequent passage as literally as possible.

Highness' Elder Brother has bidden me ask: Will the inhabitants of paradise and the inhabitants of hell remain in paradise and in hell for ever or not? Whosoever can reply, will be presented with seven tahils of golddust and two girls, and his answer I am to proclaim with drums beating, and to bring it to Malacca.'

"The Sultan of Pasai ordered the Makhdum Muda⁶ to be called; the Makhdum came and was led by the Sultan to a seat next to himself. Said the Sultan to the Makhdum Muda: 'Sir, the Great King has sent Tun Bija Wangsa to ask whether those in paradise and those in hell will remain in those two places for ever or not, and I wish you would give him what he desires, so that we are not put to shame.' The Makhdum said: 'All those in Paradise will remain in it for ever, according to the Koran, wherein it is stated: Those who believe and do good works; these are the best of creatures: their reward lies with their Lord, gardens of perpetual abode, through which rivers flow; they shall remain therein eternally.' So also those in hell will remain in hell for ever, in accordance with the saying of God Most High: Unbelievers among those who have received the scriptures, and idolators, (will be) in the fire of hell, to remain always therein; these are the worst of creatures.'⁷

Tun Bija Wangsa replied: 'Is there no answer but that?' The Makhdum said: 'There is no other but that, because *khālidīna fihā abada* ('always therein, eternally')⁸; how could there be any?' At that time Tun Hasan, a pupil of the Makhdum Muda, was also sitting there and he looked away, as he did not like what the Makhdum Muda said. Thereupon the King of Pasai returned to his palace, and those who had attended the audience went back to their homes.

"In the afternoon the Sultan of Pasai went to the house of the Makhdum Muda, and said to him: 'As regards your answer to the envoy, the people of Malacca know it. Why therefore should they have put the question to us here? Is there not by chance some other answer, which they wanted?' The Makhdum said: 'Your servant has given his solution; what would be the truth to you, Ruler of the World?' The King of Pasai said: 'Possibly they wanted to hear so and so.' The Makhdum replied: 'What

⁶ Who the Makhdum Muda is, is nowhere explained. He may have been the successor of the above mentioned Makhdum Patakan.

⁷ Koran XC VIII, 6 & 7. According to the literal translation kindly given me by Dr. Pijper.

⁸ Koran XC VIII, 5. According to the literal translation kindly given me by Dr. Pijper.—Sale's translation (A new edition, without year, p. 496) has in the first instance: "they shall remain therein for ever," and in the second instance: "to remain therein for ever," the words in italics being supplemented by Sale.

⁹ This refers only to the verses about paradise; in the verse about hell the word "eternally" (*abada*) is omitted. See below.

the Ruler of the World says, is true, but what can your servant do? He has already gone too far in his words, and is ashamed to go back on them.' The King of Pasai said: 'That is easy.' When I have gone some, have the envoy called, and say to him: 'When you submitted that question earlier in the day, it was in the presence of many people, and your servant replied thus and thus, but now, in a secluded place, your servant will tell you the real truth, which is thus and thus.' The Makhdum Muda said: 'Your words, Ruler of the World, are right.' The Sultan of Pasai returned to his palace, and the Makhdum had Tun Bija Wangsa called. Tun Bija Wangsa came, and the Makhdum entertained him to dine; when they had eaten, he led him to a secluded place, and there said to him. 'Earlier in the day you asked a question before an assembly of many people, and your servant replied thus and thus; now your servant will tell you the real truth, which is this.'

"Tun Bija Wangsa was very much pleased to hear the words of the Makhdum, and gave him the seven tahils of golddust and the two slave-girls. He had the answer proclaimed with drums beating all along his way to his ship. The King of Pasai asked: 'What is that sound of drums in the middle of the night?' The Penghulu Bujang Makhluk, Tun Jana Biri-Biri, replied: 'Your Highness, what the envoy had asked for, he has now obtained. It was told him by the Makhdum, and that is what he proclaims with drums beating.' The Sultan of Pasai said nothing. By the Makhdum the seven tahils of golddust and the two slaves were respectfully presented to the Sultan, but the Sultan said: 'Of what use is all this to your servant? You take it, Sir'—The Makhdum gave Dang Bibah the name of Dang Lela Nida-hari."

The rest of the chapter narrates that Tun Biji Wangsa returned safely to Malacca, where Sultan Mansur Shah and Maulana Abu Bakar were very much pleased with the answer and praised the Makhdum Muda. But what that answer really was, is not mentioned in the *Séjarah Mélanyu*: yet it must have been of importance to the Malays of Malacca of that time, or the annalist would hardly have devoted a whole chapter to this episode.¹⁰

A probable answer to the question as to what the Makhdum Muda, or rather the Sultan of Pasai through him, may have said to Tun Bija Wangsa, may be found in the *Islamic Review*, edited

¹⁰ Chapter XXXII of the *Séjarah Mélanyu* mentions another embassy of Malacca to Pasai with a theological "poser" under Sultan Mahmud, the last of the Kings of Malacca, about a difference in opinion between the learned Ulamas of *Mawarau-n-nakar* (Transoxania) and those of Khurasan and Irak regarding the meaning of the words: "Whosoever says that God—praised be the Most High—has created and has nourished (His people) through the infinite years that are past, verily he is an unbeliever, and whosoever says that God—praised be the Most High—has not created and not nourished (His people) through the infinite years that are past, verily he (also is an unbeliever)." The answer is given by Tun Hasan (probably the pupil of the Makhdum Muda mentioned above), but it also is not recorded in the *Séjarah Mélanyu*.—*The Hikayat Raja-Raja Pasai* does not mention these embassies.

by Al-Haj Khwaja Kamal-ud-din, the Imam of the Mosque, Woking, England, vol. XVII, No. 8, August 1929, in a note about the Quaránic Conception of Hell, which says:

"We.....take the opportunity of quoting the words of Maulana Muhammad 'Ali, M.A., from his Introduction to his recent English translation of the Holy Qur-an, Lahore 1928, page LXVI et seq., which deal with the conception of hell from the viewpoint of the Qur-án and the sayings of the Holy Prophet Muhammad....

The Maulanā, after describing the Islamic conception of Paradise, says:

"Quite in accordance with the idea of paradise as a place of unending progress to higher stages of life is the idea of hell where punishment is not meant for torture but for purification, in order to make a man fit for spiritual advancement. The idea underlying hell is that those who wasted their opportunities in this life shall, under the inevitable law which makes every man taste of what he has done, be subjected to a course of treatment of the spiritual diseases which they have brought about with their own hands. It is for this reason that the Holy Qur-án makes a difference between the abiding in paradise and the abiding in hell, allowing a termination in the latter case, but not in the former.....

It is in consonance with its remedial nature that we find it stated that the sinners shall be ultimately taken out of hell. It is true that the word *abad* is thrice used in the Holy Qur-án in connection with the abiding in hell (IV, 169; XXXIII, 65; LXXII, 23), but *abad* indicates *eternity* as well as *long time*, and that the latter significance must be taken in this case is made clear by the use of the word *ahqāb* (LXXXVIII, 23), meaning *years* or *long years* in the same connection. Besides this, limitation is placed on the abiding in hell by the addition of the words "except as thy Lord please," the exception clearly indicating the ultimate deliverance of those in hell. The following two verses may be quoted in this connection:

"He shall say, The fire is your abode, to abide in it, except as God please; for thy Lord is knowing, Wise." (VI, 129).¹¹

"So as to those who are unhappy, they shall be in the fire; for them shall be sighing and groaning in it: Abiding therein so long as the heavens and the earth endure except as thy Lord please; for thy Lord is the mighty doer of what He intends." (XI, 106, 107).¹²

¹¹ Sale translates (l.c. p. 111): "God will say, Hell fire shall be your habitation, therein shall ye remain for ever, unless as God shall please to mitigate your pains, for thy Lord is wise and knowing."

¹² Sale translates (l.c. p. 185): "And they who shall be miserable shall be thrown into hell fire; there shall they wail and bemoan themselves: they shall remain therein so long as the heavens and the earth shall endure; except what thy Lord shall please to remit of their sentence; for thy Lord effecteth that which he pleaseth."

" Both these verses clearly show that the punishment of hell is not everlasting. To make this conclusion clearer still, the latter of these occasions may be compared with the verse that describes the abiding in paradise in the very next verse:

' And as to those who are made happy, they shall be in the garden, abiding in it as long as the heavens and the earth endure, except as thy Lord please: a gift never to be cut off.' (XI. 108).¹³

" The two expressions are similar: those in hell and those in paradise abide in it so long as the heavens and the earth endure, with an exception added in each case showing that they may be taken out of it. But the concluding statements are different. In the case of paradise, the idea that those in it may be taken out of it, if God pleases, is immediately followed by the statement that it is a gift that shall never be cut off, showing that they shall not be taken out of paradise; while in the case of hell, the idea of those in it being taken out of it is confirmed by the concluding statement: ' for the Lord is the mighty doer of what He intends.'

" The conclusion above is corroborated by the sayings of the Holy Prophet. Thus a saying reported in *The Muslim* concludes: ' Then will God say, The angels and prophets and the faithful have all in their turn interceded for the sinners, and now there remains none to intercede for them but the Most Merciful of all merciful ones. So He will take out a handful from fire and bring out a people who never worked any good.' And Bukhari records a saying to the effect that when the sinners are taken out of hell they shall be thrown into the river of life, which clearly indicates that they shall be fit for the higher life. The *Kanzu'l-Ummal* records the following: ' Surely a day will come over hell when there shall not be a single human being in it.' And a saying of Omar is recorded as follows: ' Even if the dwellers in hell may be numberless as the sands of the desert, a day will come when they will be taken out of it.'"¹⁴

¹³ Sale translates (l.c., p. 186): " But they who shall be happy, shall be admitted into paradise; they shall remain therein so long as the heavens and the earth endure; besides what thy Lord shall please to add unto their bliss; a bounty which shall not be interrupted."

¹⁴ Dr. Pijper kindly informed me that the question which interested Malacca has often been raised in Moslem theology, and that various answers have been given to it, a summary of which is to be found in Sale's Translation of the Koran (The Koran translated into English by G. Sale, new edition by E. Denison Ross, London) in the "Preliminary Discourse," pp. 99 et seq. (In the "A new edition," referred to above, pp. 66 & 67; to the edition by E. D. Ross I had no access), and in Hughes's "Dictionary of Islam" (London 1885) under "Eternity of Punishment" and under "Hell."—Dr. Pijper adds: "The translation of the Koran by Maulana Muhammad 'Ali (quoted above in the article from the "Islamic Review") represents the ideas of the Ahmad-dijjah, i.e. the movement started by the British Indian reformer Mirza Ghulam Ahmad. The Ahmad-dijjah-movement is of a propagative nature and is strongly influenced by Indian, Christian and humanistic ideas. This translation is therefore not to be considered as the generally accepted, orthodox reflection of Moslem-views, and must be used with precaution."

In the two verses quoted in the *Séjarah Mélanyu* the difference between the duration of abiding in hell and that of abiding in paradise lies just in the use of the single word *abada*. About those in paradise it is said they will *khálidina fihā abada*, i.e. they will remain therein for ever, eternally, whilst about those in hell it is only said *khálidina fihā*, i.e. they will remain therein for ever. Possibly the Makhdum Muda of Pasai based his secret dictum on that difference. He may also have based it on commentaries on the Koran or other religious writings such al-Jili's *Insanu'l-Kamil* (as Dr. Winstedt has suggested JRASB, No. 86, (1922) pp. 264-5) where two Sufi answers are apposite: "The powers of endurance of the sufferers in hell continues to grow.—until there appears in them a Divine power which extinguishes the fire, because no one is doomed to misery after the Divine attributes become manifest in him" and again, "You may say, if you like, that Hell-fire remains as it was, but that the torment of the damned is changed to pleasure." Anyhow the Pasai theologian must have said that those in hell have a chance of being delivered, and it was this which Sultan Mansur Shah of Malacca wanted to hear and had bidden his envoy to have proclaimed with drums beating. We may also conclude from the above chapter of the *Séjarah Mélanyu* that this doctrine, which part of the Muslim-world has always considered as heretic,¹⁶ was known and accepted in Pasai and Malacca about the middle of the 15th century, though the Makhdum Muda of Pasai, who apparently was aware of it and had no objection to it, did not choose to confess to it publicly.¹⁷

The writer has to tender his sincerest thanks to Dr. F. G. Pijper, Batavia, for kindly assisting him with a literal translation of the Koran-verses quoted in the *Séjarah Mélanyu*, for pointing out references, and for further most valuable help.

¹⁶ Hughes, l.c., p. 110 & 172.

¹⁷ And the author of the *Séjarah Mélanyu*? Did he not know the answer of Pasai, or did he also consider it not fit to be divulged?

A BUDDHISTIC PURIFICATION CEREMONY.

By R. J. FARRER, C.M.G.

On the evening of August 2nd., 1918, the Flagstaff at the Residency, Kelantan, was struck by lightning, the top mast being shattered.

It became obvious immediately that this Act of God was a portent, and that something definite had to be done to clear the Residency of the evil influences introduced by the electric storm. To my surprise, a suggestion made by myself for prayer by respected Hajis, followed perhaps by a Tolak Bala ceremony conducted by a well-known Bomor, was received without enthusiasm. Far more efficacious in the general opinion would be a purification by Siamese (Buddhist) priests! Indeed, unless such a ceremony took place, I should find a general reluctance to enter the precincts of a house thus designated as the object of the hostility of spiritual influences.

Accordingly, the help of the Siamese Temple authorities was enlisted through the good offices of my old friend the Raja Muda, who took upon himself the whole expense of the business.

On the morning of the 6th. August preparations began with the running up of a hut for the Priests and another for the Magician on either side of the flagstaff.

In the former were set a number of Shanghai jars filled with water, on the surface of which floated *Mayang Nyior*, *Bunga Melor*, Croton leaves and various flowers. The latter was left empty, but various articles were set up outside.

To the right were three bamboo stands, the centre one supporting a *Mayang Nyior* and a husked coconut, the others carrying a tray each, on which stood an open dish containing small portions of Raw Rice, Raw *Pulut*, (a number of cakes—*Ringginan*, *Chuchor*, *Dodol*, *Andek-andek*, *Putri Mandi*—are in my list), a banana, stem of sugar cane, durian, grilled fish and curry, and two representations of crocodiles rampant cut out of coconut leaves flanked by *Mayang Nyior*. At the foot of each stand more crocodiles and coconut blossoms were stuck in the ground.

All day a company of youths was engaged in making a rope (nearly a mile long) of dried *lalang* with a white thread running through it.

At 5 p.m. the lesser Priests arrived. One end of the *lalang* rope was taken into the Residency and tied to a rafter over the reception room; thence it was taken through the Bomor's house, from there to the flagstaff round which it was coiled twice, and thence to the Priest's hut, where it was twisted round the Shanghai jars, and the balance coiled up on the floor. One of the Priests then climbed to

the place of attachment of the rope to the rafter, and having tied a silver ring to a string let the same down thrice into a cup of water held by another Priest.

At 7 p.m. the Head of all the Siamese priests in Kelantan, 'To Raja, (who is treated as of royal blood and addressed as "Ku") arrived and was introduced. At 9 p.m. the formal business began. I was taken to the Bomor's hut and there a ball of rice paste sprinkled with scent was first charmed by the Bomor and then applied by his assistant to my forehead and drawn to my feet; this operation was repeated down my back and sides. The household underwent a similar process, and the paste was then spread on banana skins in the shape of human figures (representing self and household).

The scene then shifted to the Priest's house. Here the Bomor with his assistant knelt before the 'To Raja, addressed him at length prostrating himself frequently. I was told that he was conveying the Residency and its contents (animate as well as inanimate) to the Priests conditionally on its being reconveyed on the morrow. This over, the Priests entered the Residency, lit a taper and prayed in unison for about an hour. The prayers were clearly set pieces, not impromptu. An accompaniment of bombs "off" went on.

Then the Priests retired to their hut to pray till dawn, while the Bomor set to work in real earnest. One large bamboo cage (*Balai*) on legs and a number of small ones were prepared. On the top of these were set lighted tapers.

Inside were placed whole spread-eagled roasted fowls, raw fowls chopped up, and the human figures made of rice paste.

The wizard then began a seemingly interminable address to the spirits in the course of which I sought my bed. My sleep was continually broken by gong beats until 5 a.m. At this hour a burst of cracker firing made attempting to sleep a farce and I went out to find a crowd of all ages (Malays) rushing round the perimeter of the compound shouting, firing off crackers, beating with coconut midribs at imaginary spirits, and with sticks on perfectly real kerosine tins. As soon as this was over, the wizard's cages were thrown into the river, taking with them the spirits attracted by the incantations and the meats, and my own shortcomings transferred to the rice-paste figures.

Then the Bomor had a rest (much needed, one would think) while the assistant took charge. He went round the perimeter followed by a man carrying nine vials each containing a quid of *sireh* sprinkled with scent, by others carrying nine husked coconuts, by a strong man carrying a large stone and by myself (by request) carrying a gun and nine cartridges. At each turn in the boundary a hole was dug, a vial buried therein, the stone was placed thereon, and after more incantations the assistant, kneeling on his left knee, crashed a nut down on this stone, while at the moment of impact

I fired off a cartridge in a direction away from the Residency. As soon as the last bottle was disposed of, the *lalang* rope was taken from the Priest's house and stretched completely round the compound to form a *Tali Pupoh*. I was told that normally the *Tali Pupok* would prevent ingress or egress of anyone for four days, but that such inhibition being out of question for the Residency, the rope would operate merely to prevent the entry of hostile spirits.

Then, an interval for refreshment was proclaimed. I breakfasted and went to office to be called back at 10 a.m. to dish out, after a long address by the Bomor, three spoonfuls of rice into the begging bowl of each of the priests and the plates of the wizard and assistant. Silence reigned, and I returned to office till 11.30, when all was ready for the final ceremony. Clad in nothing but a new sarong, I was seated in a chair in the Priests' house with the household similarly clad grouped at my feet. To the chanting of the Priests we were solemnly bathed for about a quarter of an hour. The pouring was done by the Head Priest. Next the Bomor took a hand and repeated the lustration. I was then allowed to substitute a towel for the *sarong*, which had to be left behind, and return to ordinary clothes. The Head Priest then walked through every room in the Residency sprinkling water out of a brass bowl with a twig of Croton. Finally, the Bomor took a coconut leaf tied in a trick knot, dipped it in saffron-tinted *tepong tawar*, touched my forehead therewith, incanted for some five minutes and pulled it out straight. In this incantation I could occasionally catch the Malay words.....*lepas ka-kanan ka-kiri ka-belakang*..... Then the Bomor took a tray of *sireh* and its accompaniments, did obeisance to the 'To Raja, and handed the tray to him. The 'To Raja, receiving the tray, prayed for awhile, and handed it back to the Bomor, thereby, I was told, reconveying the Residency to its true owners. This concluded the ceremony.

THE BLACK ART (ILMU JAHAT).

By A. E. COOPE, M.C.S.

The employment of the black art and the invocation of demons has I suppose been a practice prevalent among criminals (and also among amateur enthusiasts) from the very earliest times.

Recently by favour of the police I obtained a small pocket book containing some specimens of the art which belonged to a celebrated Kelantan criminal. After a successful burglary in Kota Baharu he was making for the Trengganu border when he was challenged by a detective. He drew a knife and the detective's pistol missing fire, he effected his escape. But in the scuffle he dropped certain bundles containing a quantity of stolen property and some of his own belongings; amongst the latter was the pocket book.

He also dropped a cloth belt containing a charm obviously Siamese, written on strips of paper gummed together, the whole over five feet long. It consisted of a number of designs with occasional Siamese words. With some difficulty (several Siamese on being appealed to refused to have anything to do with it) I obtained an explanation of the charm. My informant stated that the Siamese words meant e.g. "prevent blows," "enormous strength," "thickness of skin," "always in luck," "love of women" and that the idea was that the effect of the charm would be to make the wearer strong, invulnerable and successful in love. He stated that the charm was a poor specimen and might be described as a fake. I find that a girdle charm of the same nature but of a considerably greater interest was described by Dr. Gimlette in Journal No. 82.

The book was of considerably greater interest. It contained three *Ketika* or lists of lucky and unlucky times, a list of days of ill omen, three invocations to evil spirits for help in burglary (*sekot*) a bullet charm (*penguchi peluru*) and a diagram of what might be described as a "bad luck compass" called by Malays *bintang chelaka*. There is nothing intrinsically criminal about the first four or about the "bad luck compass." But the invocations and bullet charms have an obviously criminal intent besides being blasphemous.

There may be observed in them that mixture of orthodox religion and prayer to evil spirits which is universally common in the black art. They also share a common characteristic of such efforts in being somewhat obscure in details, an obscurity due no doubt partly to corruptions in the text and partly to the fact that professors of the art of dealing with the supernatural, from whom such documents originate, are apt to conceal the common-place in resounding abracadabras.

Thus a wizard in the Ingoldsby Legends summons the Devil with "Hard words" such as no men but wizards dare utter:

Dies mies! Hocuspocus!
Adsis Demon! Non est jokus!
Hi Cocolorum—don't provoke us!
Adesto! Presto! Put forth your best toe."

From the point of view of such professors it is not good that their language should be "understood of the people." In the pocket book in question there were undoubtedly corruptions of the text such as are particularly liable to occur with Jawi script where a mistake in a dot may radically alter a whole word. Most of the corruptions were obvious even to me but in the case especially of the bullet charm I have to acknowledge gratefully the assistance of Tengku Khalid of Kota Baharu, a connoisseur of ancient lore.

Several Malays to whom I showed the bullet charm could make little of it (and the "bad luck compass" was Greek to them). I append romanised copies of the original writings (as corrected) with translations and comments. In translating I have sometimes shortened the literal translation by avoiding repetitions.

1. Pasal pada menyatakan berjalan pada hari Ahad, ambil ayer basoh muka berjalan supaya beroleh laba.
Jika pada hari Isnain kita berjalan, tidor dahulu supaya beroleh laba.
Jika pada hari Salasa kita berjalan, minum ayer dahulu berjalan supaya beroleh laba.
Pada hari Rabu kita berjalan, makan nasi dahulu berjalan supaya beroleh laba.
Jika pada hari Khamis kita berjalan, ambil habu tabor dahulu berjalan supaya beroleh laba.
Jika pada hari Juma'at kita berjalan, bergurau dahulu berjalan supaya beroleh laba.
Jika pada hari Sabtu kita berjalan, napas kita keras di-kanan berjalan supaya beroleh laba.

Translation of above.

Rules to be observed on various days before going out if success is to be obtained:

- On Sunday first wash your face in water;
On Monday first lie down a while;
On Tuesday first drink water;
On Wednesday first have a meal;
On Thursday first sprinkle ashes;
On Friday first sport awhile;
On Saturday first make sure that the breath comes more strongly from the right nostril.
- 2. Pasal pada menyatakan ketika berjalan. Pada malam Ahad kita berjalan, ayam naik sarang mara di-kiri, dan jendera budak mara di-kanan, dan jendera orang tua baik sampai siang.
Jika pada malam Isnain kita berjalan, ayam naik sarang datang kapada jendera budak baik, dan jendera orang tua jangan berjalan tiada baik, dan tengah malam baik sampai siang.

Jika pada hari Salasa kita berjalan, ayam naik sarang jahat dan jendera budak baik dan jendera orang tua jahat dan tengah malam baik sampai siang.

Jika pada malam Rabu kita berjalan, ayam naik sarang baik, dan jendera budak jahat menyimpang di-kanan jangan, dan tengah malam menyimpang di-kiri baik sampai siang.

Jika pada malam Khamis kita berjalan, ayam naik sarang jahat, jendera budak jahat, jendera orang tua baik sampai siang.

Jika pada malam Juma'at kita berjalan, ayam naik sarang baik, jendera budak jahat, jendera orang tua baik sampai siang.

Jika pada malam Sabtu kita berjalan, ayam naik sarang datang kepada jendera budak baik, dan jendera orang tua jahat, dan tengah malam baik sampai siang.

Translation of above.

Rules to be observed as to the times of going out at night:

On Saturday night at fowls' roosting time there will be danger on the left, at children's bedtime danger on the right, at adults' sleeping time it will be good until the morning;

On Sunday night from fowls' roosting time until children's bedtime it will be good; at adults' bedtime it will not be good and do not go out; from midnight until morning it will be good;

On Monday night at fowls' roosting time it will be bad, at children's bed time good, at adults' bedtime bad and from midnight until morning good;

On Tuesday night at fowls' roosting time it will be good, at children's sleeping time bad, if you turn to the right but at midnight it will be good until morning if you turn to the left;

On Wednesday night at fowls' roosting time and at children's bedtime it will be bad but at adults' bedtime it will be good until morning;

On Thursday night at fowls' roosting time it will be good, at children's bedtime bad, at adults' bedtime good until morning.

On Friday night from fowls' roosting time until children's bedtime it will be good, at adults' bedtime bad and at midnight good until morning.

3. Jika hari Ahad kita berjalan pagi-pagi, kerugian; jika tengah naik, beroleh laba; jika tengah hari, bertemu dengan sejahtera; jika leser, bertemu dengan orang besar-besar; jika petang, bertemu dengan seteru.

Jika pada hari Isnain kita berjalan pagi-pagi, gundah hati; jika tengah naik, beroleh laba besar; jika tengah hari, bertemu dengan seteru; jika tengah turun, beroleh laba; jika petang, bertemu dengan seteru. Insha'Allah ta'ala.

Jika pada hari Salasa kita berjalan, pagi-pagi, tiada baik; jika tengah naik, bertemu dengan seteru; jika tuleh tenggala, beroleh laba; jika tengah hari, akan membuang ayer mata; jika leser, beroleh laba; jika petang, sejahtera. Insha'Allah ta'ala.

Jika pada hari Rabu kita berjalan pagi-pagi, bertemu dengan orang besar-besar atau orang baik; jika tengah naik, beroleh laba ampat kali atau dua kali; jika tengah turun akan petang, sejahtera. Insha'Allah ta'ala.

Jika pada hari Khamis kita berjalan pagi-pagi, buleh laba tetapi hilang pula; jika tengah naik, bertemu dengan seteru; jika tulehan tenggala, beroleh laba; jika tengah hari beroleh laba besar; jika leser, sakit kaki; jika tengah turun, bertemu dengan keluarga; jika petang, sejahtera. Insha'Allah ta'ala.

Jika pada hari Juma'at kita berjalan pagi-pagi, baik; jika tengah naik, bertemu dengan seteru; jika leser, bertemu dengan keluarga; jika tengah turun, ingat-ingat; jika petang, baik. Insha'Allah ta'ala.

Jika pada hari Sabtu kita berjalan pagi-pagi, baik; jika tengah naik, bertemu dengan seteru; jika tengah hari, mara besar; jika leser, beroleh laba besar puteh; jika petang, tiada baik kapada ketika itu berjalan. Insha'Allah ta'ala. Tamat.

Translation of above.

If you go out on Sunday at dawn you will lose, if at sun-up you will obtain profit, if at midday you will obtain safety, if in the afternoon you will meet great men, if in the evening you will meet an enemy.

If you go out on Monday at dawn you will be anxious, if at sun-up you will obtain a great profit, if at midday you will meet an enemy, if in the afternoon, you will obtain profit, if in the evening you will meet an enemy. If Almighty God pleases.

If you go out on Tuesday at dawn, it will not be good; if at sun-up, you will meet an enemy; if when ploughing stops, you will obtain a profit; if at midday, you will weep; if in the afternoon, you will obtain a profit; if in the evening, you will be safe. If Almighty God pleases.

If you go out on Wednesday at dawn, you will meet great men or good men; if at sun-up, you will obtain a four fold or two fold profit; if in the late afternoon till evening, you will be safe. If Almighty God pleases.

If you go out on Thursday at dawn, you will obtain a profit and loose it again; if at sun-up, you will meet an enemy; if when ploughing stops, you will obtain a profit; if at midday, you will obtain a great profit; if in the afternoon, you will

hurt your foot; if in the late afternoon, you will meet relatives; if in the evening, you will be safe. If Almighty God pleases.

If you go out on Friday at dawn, it will be good; if at sun-up, you will meet an enemy; if in the afternoon, you will meet relatives; if in the afternoon, beware; if in the evening, it will be good. If Almighty God pleases.

If you go out on Saturday at dawn, it will be good; if at sun-up, you will meet an enemy; if at midday, there will be great danger; if in the afternoon, you will obtain a great and easy profit (a); if in the evening, that is a bad time to go. If Almighty God pleases. The End.

(a) I have translated *laba puteh* (literally "white profit") as "easy profit" as I understand that this expression is thieves' slang for "easy money." Tengku Khalid however thinks that the reference is to the colour of the "swag" to be obtained e.g. white cloth, silver or diamonds as opposed e.g. to gold.

Pasal peri menyatakan nahas akbar.

4. Pertama bulan Muhamarram delapan likor hari bulan, nahas; pada sapuloh hari bulan Safar, nahas; pada empat hari bulan Rabi-al-awal, nahas; pada delapan likor hari bulan Rabi-al-akhir, nahas; pada dua likor hari bulan Jamad-al-awal nahas; pada dua puluh hari bulan Jamad-al-akhir, nahas; pada dua belas hari bulan Rajab nahas akhbar (nahas besar); pada dua puluh hari bulan Sha'ban, nahas; pada tujoh likor hari bulan Ramthan, nahas; pada delapan likor hari bulan Zu'l-Ka'dah, nahas. Tamat.

Translation of above.

A list of days of great ill-omen.

The 28th of Muhamarram, the 10th of Safar, the 4th of Rabi-al-awal, the 28th of Rabi-al-akhir, the 22nd of Jamad-al-awal, the 20th of Jamad-al-akhir, the 12th of Rejab (especially ill-omened) the 20th of Sha'ban, the 27th of Ramthan, the 28th of Zu'l-Ka'dah. The end.

Bismillah-Rahmani-Rahim:

5. Al-salamu alaikum, ya Habib-i-ku Nur Allah, si-katup mulut (a) si-gempa bumi! Ya Arif Maharaja Jin Islam tujoh beradek! Ya sayidi sakti kapada bumi yang tujoh ismu Allah! Nama-mu aku tahuakan, asal-mu keluar daripada bayang-bayang Nur Allah, mu-lah silakan berbantu bimbar berpasok sama bertimbang balek dengan aku malam dan siang, mu-lah jadi hulubalang di-hadapan aku!

(a) The manuscript has *Si-katokmilok* which appears meaningless. Tengku Khalid suggests *Si-katup mulut* a constant epithet of helpful jins.

Translation of above.

In the name of God; the Merciful the Compassionate! Peace be with you! Ho my Friend, the Light of God! Closer of Mouths, Shaker of the earth! Ho Most Wise Royal Jins of Islam, ye Seven Brethren! Ho Mighty Powers of the Seven Worlds, Names of God! I know your names, you come from the Shadows of the Light of God! Pray help me and support me and defend me and bring me back! By day and by night be my guards before me.

Bismillah-Rahmani-Rahim:

6. Al-salamu alaikum Ya Habibi-ku Nur Allah, Ya kekaseh Maha-raja Jin Islam tujoh beradek! Ya Sayidi Sakti pada udara yang tujoh! Ismu Allah! Nama aku tahuhan: asal-mu keluar daripada bayang Nur Allah! Mu silakan turun mari berbantu bimbar berpimpin sama aku bertimbang balek dengan aku, malam dan siang mu-lah jadi hulubalang di-hadapan aku! Mu mari buleh bagi hajat penoh masok akan hari kelak! Aku nak suroh-mu' gi tutup pintu tujoh, mu-kunchi pintu sembilan si-anu, beri terkunchi, beri mati saperti mayat di-hantar di-dalam kubor! Aku suroh mu tindeh si.....tujoh sifat, tujoh anggota si-anu beri berat saperti langit dengan bumi! Mu-beri mati-matikan saperti mayat sudah hantar di-dalam kubor! Aku suroh mu tindeh hati, jantong, limpa, paru hempedu si-anu, beri tertutup, terkunchi, tersangkut, beri mati-matikan saperti mayat sudah hantar di-dalam kubor.

Translation of above.

In the name of God! the Merciful! the Compassionate! Peace be with you! Ho my Friend the Light of God! Ho well-beloved Royal Jins of Islam, ye Seven Brethren! Ho Mighty powers of the Seven Heavens. Ho names of God! I know your names, you come from the shadows of the Light of God! Pray come down and help me and support me and lead me by the hand and bring me back! By day and by night be my guards before me! Come and fulfil my wishes for the days to come! I bid you go and close the seven senses and lock the nine doors (a) of so-and-so, lock him and fasten him and make him as it were dead as dead as a corpse in the grave! I bid you press down the seven senses of so-and-so, the seven parts of so-and-so press on him as heavily as the sky upon the earth, make him as it were dead, as dead as a corpse in the grave. I bid you press down the liver, the heart, the kidneys, the lungs and the gall of so-and-so, close him and lock him and fasten him and make him as it were dead, as dead as a corpse in the grave.

- (a) The numbers 3, 7 and 9 especially 7 have a mystic potency. Compare the witches of Macbeth:

" He shall live a man forbid! Weary sev'n nights,
nine times nine."

It is the " doors " of the victim's senses of course that are to be locked, not the doors of his house!

7. Al salamu alaikum ya Habib-i-ku Nur Allah bangsawan Raja Jin di-langit, Maharaja Jin Islam tujoh beradek! Ya Sayidi Sakti kapada langit yang tujoh! Ismu Allah. Aku tahuhan asal mu keluar daripada bayang-bayangan Nur Allah, mu silakan turun mari berbantu bimbar berpimpin sama dengan aku bertimbang balek dengan aku, siang dan malam mu-lah jadi hulubalang Maharaja di-hadapan aku. Aku suroh mu gi tutup pintu tujoh, mu-kunchi pintu sembilan si-anu, beri tertutup terkunchi beri mati-matikan saperti mayat sudah hantar di-dalam kubor. Tamat.

Translation of above.

Peace be with you! Ho my Friend the Light of God, Noble and Royal Jins of Islam, ye Seven Brethren, Mighty Powers of the seven skies! Ho names of God! I know your origin, you come from the Shadows of the Light of God! Pray come down and help me and support me and lead me by the hand and bring me back! By day and by night be my guards before me, Royal Jins! I bid you go and close the seven doors and lock the nine doors of so-and-so, close him and lock him and make him as it were dead, as dead as a corpse in the grave.

8. Awang Chik, Ma Chik, Anak Chik jangan di-bunoh darah manusia! Hey Chik, orang tiga beranak, bapa-mu di-cherang, mak-mu di-laut, anak-mu di-padang! Hey Chik aku tahuhan asal-mu, Chik batu, Chik manusia, Chik tanah, Chik darah! Hey Chik mu undor! kalau ta'undor mu.....! Aku tahuhan asal-mu orang tiga beranak, mu-keluár di-dalam tanah. Nabi Adam bapa-mu, Seh Mabu mak-mu, (? tanah raya) anak-mu. Hey bedil jangan makan aku, aku pesan-pesan. Hey bedil aku tahuhan asal-mu, peluru timah, mata Tuhan, peluru tagar, mata hitam Tuhan.

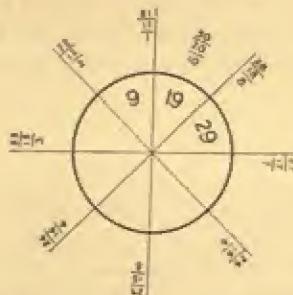
Translation of above.

Ho Little Comrades (a) Father, Mother and Son! take not the blood of mankind! Ho Comrades, three in family, Father of the jungle, Mother of the sea, Son of the plain! Ho Comrades I know your origin, you come from stone, from mankind, from earth and from blood! Ho Comrades! Avaunt! If you obey not, you.....(b) I know your origin, you are three in family, you come from the earth,

the Prophet Adam is your father, Seh Mabu is your mother, (? the mainland) is your son. Ho Gun, don't shoot me, I adjure you! I know your origin, Bullet of lead! Eye of the Lord God. Bullet of the Thunder! Black of the Eye of God!

- (a) The invocation is to the Hantu Raya or Great Demon who consists of three persons, or perhaps rather has three manifestations, namely Landi, Landak and Daim. I have translated "Awang Chik" as "Comrade" as that word seems to be the nearest English equivalent. It might almost be translated "young fellermelad." It is used as a sign of familiarity. *Tanah Raya* may be a corruption for *Hantu Raya*.
- (b) The threat is to call the Demon by his name. If one of the three is named, the other two disappear.

The Bad-luck Compass.



The explanation of this "compass" is as follows. The top of the compass points to the East. The numerals represent the days of the (Mohammedan) month. Each day there is a *bintang chelaka* (star of bad luck) also called *naga hari* (dragon of the day) and each day he changes his position to a different point of the compass. This star is not a material star of the heavens but rather an influence tending to bad luck.

It is unlucky to set out from any house, the door of which faces a point of the compass at which this "star" is in position. Thus if the door of one's house faces west, it is unlucky to set out on the 5th, 15th and 25th and so on. It will be observed that the 9th, 19th and 29th and also the 10th, 20th and 30th do not correspond with any point of the compass. On those days the influence of the "star" is universal and it has no definite point. In the case of 9th, 19th and 29th the danger will come from the earth; in the case of the 10th, 20th and 30th from the sky. On these days it is best not to set out at all. On other days if for some special reason one has to set out in face of the unlucky "star," the bad luck may be avoided by shading one's eyes with one's hand (as if from the glare of the sun) as one passes the threshold.

It is interesting to observe how the supernatural influences worked in the case of the movements of the owner of the book, in so far as they are known.

On a Friday night after midnight when it was "good until morning" he successfully burgled a house. So closely had the doors of the senses of the occupants been locked that he was enabled, after forcing a window, to rifle a cupboard standing within a few feet of the sleeping owner of the house. On his way to Trengganu, it is true, he met a detective but the bullet charm worked and the detective's pistol missed fire. (The materialistic detective later pointed out that the firing pin was worn down. Ay, but what Power wore it down?) Later he went out on a Monday at dawn and was "anxious"—with reason, for he encountered police who arrested him.

Finally on the 19th of a month, when according to the "bad-luck compass" it is best not to go out at all owing to malevolent earthly influences, he came before an earthly Judge who gave him seven years. In the face of such over-whelming proof of the value of his Art a believer might well ascribe scepticism to invincible ignorance.

COURT LANGUAGE AND ETIQUETTE OF THE MALAYS.

By DATO' MUHAMMAD GHAZZALI, J.P., D.P.M.K.,
(Dato' Bentara Luar of Kelantan).

"Biar mati anak; Jangan mati adat"

An attempt has been made in the following pages to give a brief but full account of Malay etiquette for those, especially Europeans, who desire to gain a knowledge of Malay Court language, customs and manners. The rules of this unwritten code preserved from time immemorial, are strictly observed. In times past when the kris was freely used, woe to any man whether the son of a commoner or of the nobility, who misbehaved himself in the presence of a Raja. The expression *anak kurang ajar* would be an insult to any person and was certain to provoke a fatal fight. It is therefore the duty of Malay parents to teach their children how to behave before elders and superiors so that the humblest Malay may be fit to be a follower or companion of royalty and the aristocracy. Although education of the higher kind is not regarded as of paramount importance, a knowledge of Court language and manners is thought to be a *sine qua non* even by illiterate Malays.

It is the author's hope that the following pages, compiled by one who for thirty years has been courtier and tutor to the royal family of Kelantan may serve to give the reader a closer knowledge of the Malay and his manners.

I. Formal modes of addressing persons, titles, etc.

The ruler of the state is addressed: *Duli Yang Maha Mulia Sultan*. Colloquially he is addressed: *Ka-bawah Duli*, and less formally: *Tuanku*.

The Crown Prince or Raja Muda is addressed: *Yang Teramat Mulia Raja Muda*. Colloquially he is addressed: *Ka-bawah Kaus*, and less formally as *Raja* only.

The children of the rulers are addressed: *Yang Mulia Ka-bawah Kaus Tengku*. Colloquially they are addressed: *Ka-bawah Kaus*, and less formally *Tengku*.

Consorts of Malay Princes, or Ministers of State, unless of noble birth, have no title from the rank of their husbands.

Mothers of Malay Rajas, who are not of royal birth, are addressed: *Mak Tuan* or *Mak Engku*; e.g.: *Mak Tuan Inche' Meriam* or *Mak Engku Inche' Fatimah*.

Others members of royalty are addressed: *Yang Mulia Engku* colloquially: *Engku*, and *Tuan* before they come of age.

A Chief Minister, who is not royal, is addressed: *Yang Teramat Hormat Dato' Menteri*; personally: as *Dato'*.

Other Datos are addressed: *Yang Berhormat* or *Bahagia Dato'*; personally: as *Dato'*.

Sayids, descendants of the Prophet Mohamed, are styled: *Yang Mulia Engku Sayid*, when they are married to royalty; personally as *Engku*. Children by such a marriage are addressed and treated as members of royalty.

The third person pronoun *dia* is not applied to royalty; *-nya* takes its place, e.g.:—*Tengku Ahmad ada beradu, apabila-nya jaga kelak dan telah bersiram dan santap, boleh-lah hamba sembahkan hal ini.* (Tengku Ahmad is asleep, when he awakes, and after his bath and meal, I shall inform him about this).

When speaking to a ruling prince a commoner usually calls himself: *Patek*, and when a royal person is mentioned the word *paduka* is added; e.g.:—*Patek telah mengadap Paduka adinda Tengku Chik.* (I have seen your younger brother (or cousin) *Tengku Chik*).

If the father of a prince addressed is the ruler, the words *Sri Paduka* are added, thus:—*Hamba tengku di-titah oleh sri paduka ayahanda datang mengadap ka-bawah kaus.* (His Highness, your illustrious father, commands me to come to see you). *Sri paduka ayahanda telah nugerahi satu persalinan kepada hamba tengku memakai kurnia-nya itu pada sa-barang hari.* (His Highness, your illustrious father, has given me a suit of clothes and he allows me to wear it (his gift) on any occasion. *Hamba tengku pohonkan ka-bawah kaus sila sembahkan keshukoran hamba tengku yang tha'if ini ka-bawah tapak cherpu ka-bawah duli sri paduka ayahanda.* (May I ask you to convey, please, my humble thanks to His Highness, your illustrious father).

Terima kaseh is not used when thanks are tendered to royalty.

Deceased royalty is called al-Marhum, thus:—*al-Marhum Sultan Mulut Merah: al-Marhum Sri Paduka Nenenda Sultan Bongsu telah hilang* (or *mangkat*) *sekarang ampat-puluh tahun lama-nya* (Your grandfather, the late Sultan Bongsu, has been dead for forty years). *Harap di-ampuni, pada zaman al-Marhum sri paduka ayahanda dengan tuwah-nya, patek-lah sahaja sa-orang yang beroleh* (or *menjunjung*) *pangkat itu.* (May it please your Highness, during your late father's reign, by his grace I was the only person who held that position). *Patek sa-orang daripada jumlah pachal-pachal yang mengiringi-nya takala-nya berangkat mengadap Raja Maha Besar Siam di-Bangkok.* (I was one of the party accompanying him on the occasion of his visit to His Majesty the King of Siam in Bangkok).

The word *pachal* is applied to all common people referred to in conversation with (or writing to) royalty.

When a person of position, a Dato' or a member of the gentry, is mentioned while one is addressing royalty *Hamba tua* should be used if the person mentioned is older than the royal person addressed, and *Hamba kecil* in case the person mentioned is younger.

Furthermore, consorts of royal person, who are not of royal birth, are, when mentioned during conversation with their husbands, mentioned as *Hamba kecil*; and *Hamba tua* is used for a Raja's mother, if she is not of royal birth.

A royal consort, older than her husband, is mentioned as *Paduka Adinda*, when one is talking or writing to her husband. When a royal consort is Sultana, Raja Puan or Permaisuri the word *Sri* is added in front of *Paduka*.

Examples:—*Harap di-ampuni, patek pohonkan kecherapan jika hamba tua Dato' Pahlawan boleh di-ampuni oleh Ka-bawah Duli mengadapi musoh itu.* (May it please Your Highness, I pray to know if Dato' Pahlawan may have your gracious consent to meet the enemy).

Hamba kecil Wan Ismail ini pada hemat patek yang bebal tidak-lah layak boleh di-harapkan dengan tanggongan yang demikian itu. (This young gentleman Wan Ismail is, in the opinion of your humble servant, who is lacking in wisdom, not suitable to be trusted to bear the burden of such responsibility).

Hamba kecil di-dalam sambut Ka-bawah Duli berangkat kadar sa-piak pinang (or *sa-piak sireh*). (Your Highness' consort will welcome you inside for a few minutes).

Sri paduka adinda hendak berangkat ka-darat. (Your royal consort intends to go upcountry).

Although children of Datos are, by courtesy, addressed *Hamba kecil*, when mentioned in addressing a Raja, a Dato', to humble himself and his family, should mention his son or any member of his family, when talking or writing to royalty, as *Pachal* e.g.:—*Ampun tuanku, ada-lah patek datang mengadap ini dengan besar hati patek hendak pohon tumpangkan* (or *kirimkan*) *pachal patek ini yang tidak berjuru lagi kurang cherap bahasa beraja-raja.* *Jika ada limpah ampun, sila Ka-bawah Duli jadikan dia hamba tuanku yang menunggu pintu atau menyapu balai atau mana-mana titah perentah di atas dia.* *Jika di-murka atau di-bunuh sa-kali pun redza-lah patek.* (May it please your Highness, I appear before you with the high hope of placing at your disposal this humble son of mine, who does not know how to behave himself and is ignorant of royal etiquette. With your gracious consent, may you be pleased to take him as a slave to watch the gate or sweep the hall, or do whatever you may command him. If you deem fit to inflict punishment on him with your wrath or even by death, I have no objection).

Tidak tahu is never used when talking to royalty or to one's superior. *Kurang preksa* is the right expression when polite; *kurang cherap* is used in conversation with royalty only. *Besar hati* is the most polite expression when one solicits a royal favour.

Patek dengar hamba kecil Wan Ismail anak hamba tua Dato' Pahlawan akan di-kurnia'i nama dalam masa kerja masok Jawi hadapan ini. (I hear Your Highness is going to bestow a title on Wan Ismail, son of Dato' Pahlawan, during the forthcoming circumcision festivities).

Pachal Ahmad tukang perahu ada menanti di-luar, hendak mengadap dengan sadikit persembahan. (Ahmad, the boat-builder, is waiting outside to see your Highness with some offerings).

Pachal tua patek di-teratap pohonkan beribu-ribu ampun jika dengan tuah tidak ia uzor petang ini, ia akan datang mengadap. Ia telah sakit cherah perut, tetapi dengan tuah telah dapat sadikit. (My father at home craves your pardon, if by your grace he is not indisposed this evening, he will come and appear before you. He has been suffering from an attack of diarrhoea, but by your grace he is now a little better).

In letters a royal uncle addresses his ruling nephew thus:—*Duli Yang Maha Mulia Sri Paduka Ananda Sultan*; he mentions himself as *Paduka Ayahanda*. Personally and less formally: *Raja* or *Sultan* as the case may be, and himself as *Ayah*.

A royal aunt: *Duli Yang Maha Mulia Sri Paduka Ananda Sultan*, and herself as *Paduka Bonda*; personally and less formally: *Raja* or *Sultan*, and herself as *Inche'*.

Younger brothers, sisters, cousins, nephews and all the members of royalty, who are younger than the ruler, address him in correspondence *Duli Yang Maha Mulia Sri Paduka Kakanda* (or *Ayahanda*) according to rank and relationship; less formally: *Kabawah Duli* and themselves as *patek*, the same mode as an ordinary subject.

Elder brothers, sisters, cousins and all other members of royalty, who are older than the ruling prince, address him in writing: *Duli Yang Maha Mulia Sri Paduka Adinda*, and themselves: *Paduka Kakanda*; personally and less formally: *Raja* or *Sultan*, and themselves as *Abang* by the brothers, *Kawan* by sisters, and *Kabawah Duli* or *Patek* by cousins or distant relatives.

A Raja in correspondence calls his royal mother or aunt *Paduka Bonda* and himself *Paduka Ananda*; personally: *Inche'*, and himself *Hamba Tengku*.

A Raja in correspondence calls his royal uncles *Paduka Ayahanda* and himself *Paduka Ananda*; personally: *Ayah*, and himself *Hamba Tengku*.

A Raja in correspondence calls his elder brothers, sisters and cousins *Paduka Kakanda*, and himself *Paduka Adinda*; personally *Abang* and himself *Hamba Tengku*.

A Raja in correspondence calls his younger brothers, sisters and cousins *Paduka Adinda*, and himself *Paduka Kakanda*; personally *Adek*, and himself *Abang*.

Brothers-in-law and sisters-in-law are addressed by the ruling prince in the same way as their respective consorts or husbands despite age or rank of relationship before marriage.

A ruling prince speaks of a royal grandparent as *Paduka Nenenda*, and himself as *Paduka chuchunda*; colloquially *to' Engku*, and *Hamba tengku*.

A Raja calls a royal great-grandparent *Paduka Moyanda*, and himself *Paduka Chichinda*; colloquially: *to' Yang*, and himself *Hamba Tengku*.

Among members of royalty and nobility elders personally address the younger, not by name, but by rank of relationship. An elder brother, sister or cousin addresses his (or her) junior as *Adek*, and calls himself *Abang* (or herself *Kawan*).

A younger brother, sister or cousin personally addresses his (or her) seniors *Abang*, and calls himself (or herself) *Hamba Tengku*.

An uncle (or aunt) addresses his (or her) nephew (or niece) as *Anak*, and calls himself *Ayah* (or herself *Inche'*).

A prince (or princess) usually addresses his (or her) father, who is not a sovereign as *Engku*, and calls himself (or herself) *Hamba Tengku*.

A Raja in correspondence addresses a *Dato'* as *Orang tua kita*, and calls himself *kita*: colloquially *Dato'*, and *kita*, or in Kelantan, *Nik*:

Paduka bonda Tengku Meriam di-ulu sabda kapada patek-nya tidak boleh berangkat hilir sebab-nya berasa ulu. (Your royal aunt Tengku Meriam in the interior told me that she could not come downstream because she had a headache).

Paduka ananda Tengku Besar suroh patek sembahkan ma'alum bahawa paduka ananda itu akan berangkat mengadap ka-bawah Duli lagi sa-penanak nasi. Your Highness' son Tengku Besar commands me to inform you, that he will come and appear before you in half an hour.

A wife corresponding with her husband addresses him *Kakanda*, and calls herself *Adinda*; colloquially he is *Dia* or *Diri*, and herself *Kita* or *Kami*.

A husband addresses his wife when corresponding, *Adinda* and himself *kakanda*; colloquially he calls her *Dia* or *Diri*, and himself *Kita* or *Kami*. If the couple are of royal birth, the word *Paduka* is used in correspondence in front of *Kakanda* or *Adinda*.

A mother or a father, among commoners, is often addressed by the name of the firstborn child: *Mak Awang*, mother of Awang, and *Pak Awang*, father of Awang.

It is not polite to address an elder by name, either formally or colloquially. In correspondence an elder, who is not as old as one's father, should be addressed *Kakanda* or, if younger, *Adinda*, or if as old as one's father or mother *Ayahanda* or *Bonda*.

Gurus are addressed by their pupils in correspondence *Ayahanda*.

Malays among their equals address one another in correspondence as members of one family.

Kami is also used by ordinary people when talking to friends of equal standing, and the second person pronoun is *Awak* or *Diri*.

Aku, *kamu* or *engkau* are used only when talking to a slave, servant, or person of the lowest class. *Aku*, *kamu* or *engkau* can, however, be used by a person talking to junior members of his family.

Hamba is always used when a person addresses people older than him or herself.

In addressing the Almighty Allah the pronoun *Kamu* or *Dikau* (thou) are used, and *Aku* or *Hamba-mu* are solemnly used.

II. Colours of State.

White:—is the colour of the royal standard.

White centre with yellow margins:—the flag of the Crown Prince.

Yellow:—the colour of royalty.

Green:—the Chief Minister of State, the Bendahara.

Black:—the Keeper of the Peace, the Temenggong.

Red:—the Laksamana, leader of the fighting forces.

If any of these officers is a royal personage his flag is bordered with yellow.

III. Umbrellas of State.

The umbrella is a token of prestige. A big white umbrella borne by a bearer called *Jurupayong* selected from the gentry, is used on state occasions by the Sovereign. The Crown Prince walks under a yellow umbrella of similar size. Other members of the royal family are privileged to have big paper umbrellas. At a marriage ceremony or at a funeral these big umbrellas may be used by any subject and borne by his friends, but if a commoner uses one as an ordinary umbrella, it must be borne by himself.

IV. Spears of State.

When the Sovereign proceeds outside his palace on foot, on an elephant or on horseback, he is preceded by armed spearmen,

from at least seven up to forty in number, as circumstances may require. They move in Indian file, the foremost carrying on his shoulder a bundle of five spears, the second carrying three spears, the third two, and the rest one spear each. Woe to the man who cuts across the path of a royal procession!

All members of the royal family as well as Datos may have armed guards, but the number of men, is limited to five: when they accompany the Sovereign, they may have no personal guards.

V. The Palace of a Malay Raja.

The palace of a Malay Raja consists of several roofs or houses connected. At least four houses (*puri* or *dalam puri*) are reserved for the womenfolk: for the men there are at least three (*balai*).

All state affairs are conducted in the *Balai* or Audience Hall. It is open to the public during the day time or as long as the big gate, (*pintu gerbang*) of the enclosure (*Kota*) is open. Beside the big gate there is a small door, a private entrance for the palace inmates or other known persons, when the big gate is closed.

The *balai* has only three walls, two on both sides and one at the back, dividing the *Istana* or partitioning the *Puri*. The front part of the *Balai* is open, without doors or railing; any one is allowed to come in and squat down on the ground floor without being challenged. Halfway is a platform called *Tapakan*, one foot high, about ten feet wide and of the same length as the *Balai*. There are two more platforms of the same kind, one above the other. In the middle of the top-platform is a dais about 15 by 40 feet, where members of the royalty take their seats. The first *Tapakan* below the dais is reserved for Ministers of State, Datos and Nobility, the second for gentry (*Orang-orang anak baik*), and the third for the middle class such as traders, shopkeepers, tailors, clerks, etc. The peasantry is allotted the ground floor.

VI. Jamuan Raja, or Royal Feast.

Malays dine in company of four or five, seated on the floor (which is usually carpeted) crosslegged round a brass tray (*pahar*), about twenty inches in diameter, ten inches high and on a pedestal. The *pahar* is also made of gold or silver for royalty. On it are placed several bowls, the size of fingerbowls, containing curries and other viands; on the bowls are arranged small plates containing fried or dry dishes, piled one upon another. On the top of all is a tiny plate on which there are several china spoons for the curries, and some salt. Before each guest a smaller *pahar* about ten inches in diameter, is placed. It is called *anak kasa* (*anak gangsa*) and on it is the guest's rice plate.

The *pahar*, as well as the *anak kasa* (*anak gangsa*) is covered with a *saji* made of matwork, and over this a cover of embroidered

silk called *tudong hidang* or *tudong saji* is spread. By the side of the *pahar* is a metal tray, covered with a *tudong saji* and containing four or five small teacups; a teapot is found under an embroidered *tudong saji* on a small *anak kasa* about six inches in diameter: it is called *tapak serja* (in Kelantan) or *kaki batil* (in Trengganu).

A short distance from the *pahar* is another metal tray on which stands a decanter with water, covered with a *tudong saji* and surrounded with four or five pint tumblers.

All the above form a *hidangan nasi*. Each tray is carried with both hands above the right shoulder by palace attendants, who in Indian file appear from the inside of the palace, moving gently and slowly forwards. The guests often eat their meal where they are seated already, as, on arrival at the palace, each is invited to sit in his proper place according to rank. The "laying of the table" is done in front of the guests, who are assembled in rows facing the Sovereign on his royal dais.

Firstly spittoons are arranged, secondly trays holding decanters and glasses, thirdly big *pahar*, fourthly *anak gangsa*, and lastly trays of teacups and teapots together.

The spittoons, *ketul*, stand at arm's length behind the guests, who have to wash their right hands before and after eating. Malays seldom wash in a vessel unless it contains a certain quantity of water permitted by their religion.

At each *hidangan* one or two honorary waiters, usually young men of the nobility, are appointed to help the guests; they are well dressed, and have been selected and invited by royal command. Paid servants are regarded as vulgar. It is customary for a host to attend on his guest: hence the service of honorary waiters as deputies of their master who is not expected to eat with his guests, which would be regarded as a breach of etiquette, indicating hunger on the part of the host.

During dinner it is not a breach of etiquette to sit with one's back turned on royalty. When all the guests have assembled, palace attendants appear in Indian file from inside, each with a large brass spittoon, held in the left hand by the brim. Spittoons are not to be carried above the shoulder like food. As soon as the attendants are in a line, standing about two or three yards apart, they simultaneously kneel down and place the spittoon at about the spot, where each *hidangan* is to be deposited. This done, they make their *sembah* to the Raja, while kneeling. Then they rise and move out of sight.

Presently they reappear, each carrying with both hands, above the right shoulder, a tray with a decanter of water and tumblers. These are placed near the spittoon. The attendants retire, and after several minutes reappear carrying the main *hidangan*. The

pahar containing viands, are brought in first, and next follow the *anak gangsa* with rice, all carried above the right shoulder. As soon as attendants carrying the *anak gangsa* have formed a straight line, they break off in batches of four or five, each batch around a big *pahar*, then simultaneously kneeling down, placing their burden in front of them, saluting the royal host and then dispersing.

After this the covered tea trays are brought in.

When everything is ready, the Raja is informed and gives his royal command through his Bantara or Dato's in-waiting to the guests to partake of the dinner.

The royal command to the 1st Bentara:—*Dato', sambut ayah-ayah dan anak-anak raja sakalian sudikan jamuan kita yang tidak saperti-nya.* And to the 2nd Bentara:—*Dato', silakan dato' besar dan sakalian-nya basoh tangan.*

Seating himself behind the chief guest, the Bentara respectfully conveys the royal message, and turning round and facing the guests calls out the names or titles of several persons of importance with a general invitation to do justice to the dinner before them.

The guests should not remove from their seats until the one highest in rank rises. This dignitary should invite his juniors to advance with him to a *hidangan* somewhere in the middle; but one of the Bentaras will at once come forward inviting him to go to the top, followed by other guests, who may choose their own companions for dinner.

The guests are helped by the honorary waiters to wash their hands. The waiters then remove all the covers from the trays. A guest should show self-respect by observing rigid moderation. Half the rice in the plate is ample; a plate or a bowl should never be removed from the *pahar* to serve oneself. It is more for honour than for food, that one attends a royal feast.

Sweets and cakes (in Kelantan called "Tepong") are served in the same way as a *jamuan nasi* except that no *anak gangsa* are brought in. There are many different varieties of sweets and cakes, and each kind is placed on a small plate. There are usually forty plates, piled one upon another in the shape of a pagoda. The guests pick out only those on the top, with their fingers. It is risky to touch the bottom ones, so the guests must be very careful, lest the whole pile (*susunan*), might give way. This kind of accident seldom happens, and if it does, the poor fellow responsible for the crash will never again appear at a royal feast, at least not until the incident is almost forgotten.

A Bentara (a palace attendant or pursuivant) while performing his duties, is not expected to seat himself or to make a salutation to royalty, in whose presence he is privileged to move about, freely from one place to another.

It is vulgar to dip one's fingers, instead of a spoon, into any of the bowls to take a piece of meat. Dry dishes may be taken with the fingers. The guest should take one piece at a time, and it is vulgar to put several varieties on the rice, which should not be deprived of too much of its whiteness. A big piece of meat or any other eatable bigger than a mouthful, should not be taken up whole in the fingers from plate to mouth. A bit should be broken off by the fingers and carried up to the mouth. No sucking of bones is permitted. While food is still in the mouth one is expected not to talk or answer questions. To eat ravenously and ask for more is a breach of good manners. It is indecent to take up a whole banana to the mouth and bite off a bit. The banana should be held in the left hand and part of its skin peeled off, then a piece of the fruit should be broken off and carried up to the mouth. The guest should not commence his meal from the centre of the rice on his plate, but from the edge of the plate near him, and gradually advance until satisfied, so that the rice remaining on his plate is still untouched and clean. The empty part of his plate should be free from all bits of bones etc., which should be thrown away into the spittoon beside or behind him.

The younger and inferior in rank must not stop and wash their hands until the eldest or the superior in rank at the *hidangan* has finished his meal and washed his hand, and no one should move from his seat before the chief, who must be in no hurry to rise in order to give everybody ample time to finish his meal.

When all guests have returned to their seats, palace attendants reappear and place before them *sireh* boxes called *puan* or *tepak*. It is more respectful to serve *sireh* in a wooden box, (*tepak*), than in a metal one called *cherana*. The size of the former is about 16 inches long, 6 inches high and 6 inches wide, with a detachable lid. It is wider at the base and the outer parts are all covered with golflowered silk. The *puan* is only for the aristocracy, while the *cherana* is for the lower class. The *cherana* is usually made of brass, much smaller than the *tepak* about half its size, and is smaller at the base than on the top; it is without a lid.

It is an ancient custom, still preserved, to offer a guest *sireh*. Malays are not bound by custom to offer drinks or tobacco to visitors, but it is gross rudeness, which in most cases cannot be condoned by an apology, if the *sireh* box is not offered a guest or a visitor. No feast, however big it may be, is complete without *sireh*.

After the *sireh* the guests may take leave of their royal host.

VII. Equality in the Mosque.

When a Malay Sultan or Raja goes to the mosque, he is usually guarded by a company of spearmen. On entering the Raja

regards himself as an ordinary man. Anyone of his subjects, high or low, may stand beside him while worshipping the Creator. Usually the Raja stands behind the Imam in the front row of the congregation. Before and after prayers he sits close by the foot of the *Mimbar*, the throne-like pulpit with seven steps, on the top of which the Khatib is seated. The Khatib stands on one of the upper steps when preaching a sermon.

On the two *Hari Raya* days, *Hari Raya Puasa* and *Hari Raya Haji*, the Khatib is the first person privileged to advance close to his Sovereign and salute him by a *Jabat Salam*. This salutation is called *Mengunchup* or *Mengunjong*.

Only on these two occasions can anyone in the mosque and in the palace afterwards, whatever his status, have the right of demanding to touch his lord's hand.

VIII. Hari Raya Festivals.

The palace is open to the public during the two festivals. The Sovereign is compelled by custom to give audience even to the humblest of his subjects.

When the ruler receives the *sembah* from the caller, he will extend his hands, putting the right hand between both palms of the hands of the caller, with his left hand covering the back of the caller's right hand, and then gently draw both his hands back. The caller does the same, but covering his face with both hands he kisses his palms. This act is called *Mengunchup*, *Mengunjong*, or *Jabat Salam*. The last mentioned ends, however, on the withdrawal of hands.

A *Hari Raya* lasts three days during which people visit one another, as a rule the younger calling on the older, and the inferior on the superior. All are bound to *salam* each other, and even in public thoroughfares acquaintances, when meeting one another, stop and hold each other's hands. They do not wish *selamat hari raya*, but simply say *minta ma'af*, which is reciprocated with *sama-sama*. The idea of a *salam* is to declare or seek peace while thus holding each other's hand. During *Hari Raya* days callers are all treated alike; one's own servants are received in the drawing room, where they are served with food and drinks as guests of equality. No angry words or quarrels are allowed, and whoever infringes this golden rule is looked upon as a savage or an outcaste. Brotherhood and democracy reign supreme during the two festivals.

IX. Marriage Festivities.

Marriage festivities are usually held at the house of the bride by her parents or by any other of her nearest relatives, on behalf of the parents.

No actual festival takes place at the bridegroom's place but on the occasion of the *Berhinaï* and the *Bersanding* ceremonies

his relatives and friends are invited to accompany him to the bride's dwelling, where those ceremonies are performed.

When a Raja performs nuptial festivities all invited male persons are, whether attending or not, expected to contribute a certain sum of money, each according to rank or office, not according to wealth or means. If the Crown Prince (Raja Muda) has to pay, say, \$100, the Chief Minister pays \$70, and other chiefs each \$50, while a rich merchant's contribution is about half of the last mentioned amount. These figures are fixed by the host.

One commanded to pay less does not feel at all happy, as he knows, that he is looked upon as a person of inferior position. This contribution is called *Ikat Tangan*, and every individual, to whom the royal invitation is extended, is thus bound to respond to it. The money is collected on the night of the *Bersanding* ceremony. Each one is called by name in order of rank. The amount, already made known, is handed over to the Grand Chamberlain, who in a loud voice counts the money, which should always be silver dollars, and throws them one by one into a gold or silver tray beside him in the centre of the audience hall, making the hall echo with the ringing of the silver pieces.

Beside the customary *Ikat Tangan*, gifts of live stock and food are brought to the palace from all parts of the country. This is called *Pengosong*.

At the *Bersanding* both bride and bridegroom sit together facing the audience on a decorated and illuminated dais, *Penjangan* or *Pelamin*, in the women's assembly hall, where all the female guests are assembled. Here the *pengantin* are nominally eating together yellow rice, undressing together, bathing together, redressing together (helped by ladies of position) and eating rice and curry together, also nominally.

As *Ikat Tangan* is for men, so is *Mengenal* for women. Beside the customary wedding gifts of foodstuffs, etc., women invited to the marriage festival are expected to contribute some money on the occasion of the formal visit, *Mengenal* paid to the bride and her mother-in-law. Three days after the *Bersanding* the mother-in-law gathers a crowd of relations and friends, almost every woman known to her without distinction, and all go in long procession to the bride, who in her bridal costume, seated at the foot of the bridal dais, is ready to receive her mother-in-law formally. When all are assembled a lady-in-waiting invites the honoured visitor to the spot where the bride is seated. The bride extends her hands for a *salam* followed by a *sembah*. The mother-in-law then places a pile, or piles, of silver dollars in front of the bride, and the lady-in-waiting takes up the money, announcing the contributor's name in a distinct and sweet voice and counting the silver pieces in the same way as described under *Ikat Tangan*. The women come up one after another, but the bride only does *sembah* to

those older than herself. There is no fixed sum for women; \$200 is, however, considered reasonable for a mother-in-law. The rest of the company may contribute as much as they think worthy of their position, but not above the amount contributed by the mother-in-law or any of the closer relatives of the bridegroom.

The amount of the two above-mentioned collections gives the newly married couple a start in life.

X. Court Costume, etc.

A yellow silk sarong may be worn only by royalty.

Trousers must be worn and everybody must always remain covered. Unless he is a privileged person or of royal blood, a man should wear his sarong under his *Baju Kurong*.

The national court costume of Kelantan consists of a head-dress, *Isek Ketam Budu*, two *Baju*, an inner and an outer, the former similar to a short-sleeved shirt called *Baju Bengan* and worn inside the trousers, above which a band of gold thread woven *Kain Selandang* (80 inches long and 30 inches wide) is tied round the waist, folded to 7 or 8 inches in width, and twisted as a protection against a *kris*-stab. A *kris* is stuck on the left side with the handle pointing outwards, to show the weapon is reversed; if placed otherwise, it indicates readiness for a fight, which is a breach of court etiquette. On the top of the *kris* and the *kain selandang* a silk or gold flowered *sarong* is loosely worn. The outer *Baju*, the length of an ordinary lounge suit, is of silk or gold thread woven cloth. It is an open *Baju* with only one button at the collar, which should always be fastened.

This national costume is also a man's wedding dress.

When a woman is entering a palace, she should always wear a long *Baju* extending below the knees, and her head-cover *Kain Kelubong* should be removed from her head and shoulders.

On state occasions gold anklets may only be worn by young ladies of noble birth. It is customary for noble ladies to be accompanied by women attendants wherever they go.

When appearing before royalty one has to sit down cross-legged and carry both hands, with the palms and fingers touching each other, up before the face, or above the forehead if the person saluted is the Sovereign. This act of salutation is called *sembah*. Almost every movement in the presence of royalty must be preceded by a *sembah*. No word is to be uttered, even in answer to a royal question, until one has seated oneself and made a *sembah*. If a person's name is called, while he is moving, or a question is put to him, he must sit down and *sembah* before he is allowed to speak; when dismissed from the conversation he again salutes, rises, and continues his progress. It is rude to speak while moving or standing. To eat when moving or standing is a form of bad

manners; a breach of this rule shows low-breding. If anyone, wearing a *kris* or other weapon or firearm, is to be presented, either by royal command or by his own request, he must, before leaving his seat, leave his weapon behind, and advance towards the royal person, unarmed; not even a stick or an umbrella is allowed on such occasions.

To take leave of royalty one says *Patek mohon*. To decline a royal offer, *Mohon patek*. When promising to do something or mentioning something which one has carried out, one must begin with the phrase: *Dengan tuah Ka-bawah Duli* (or *Ka-bawah Kaus Tengku*) or simply, *Dengan tuah*, thus:—*Dengan tuah, akan patek bawa mengadap pachal itu dengan hidup*. Or *Dengan tuah Tuanku, telah patek padamkan api yang sedang menyala dan hendak menchederakan* (or *membinasakan*) *nama tuan penghulu patek yang bertapis telah patek jadi hamba*.

When one has to hand something to or speak to a person seated on the floor, one should sit down first.

It is bad manners to use one's left hand in handling or receiving something, from another person. If the left hand must be used, the right hand is also to be extended below the left one supporting with an apology, as, *Tabek, Minta ma'af*, or if to royalty, *Ampun*.

A Malay caller never takes leave and departs when the master of the house is at dinner. If an immediate departure is necessary, he usually touches the *Sireh* box, apologising, thus:—*Ini ganti hamba*. A wellbred person never disturbs a servant while at dinner with a rebuke or the mention of an errand.

It is bad manners to cover a person with one's shadow. To pass between a person sitting down and a lighted lamp on a table or on the wall, one should bend low, or walk past lamp in hand away from the person one has to pass, and afterwards replace the lamp.

It shows want of respect to be uncovered in the presence of one's host or of one's guest.

If a person meets a royal person on the road, he should stop, take down his umbrella, and sit upon his heels *dudok berchangkong*, until the royal person has passed. He should not *sembah* unless he is spoken to. When meeting royalty, one, who is wearing a shawl or a towel round his neck, or carrying it on his shoulders, should remove the article and hold it in his hand, or carry it under his arms.

It is objectionable to report to royalty the death of a person known, if this occurs on a day when the royal person intends to commence a journey. This is called *galang batang* and the journey is postponed. The meeting of a funeral is also called *galang batang*.

Gifts sent to royalty or persons of high position are always carried on a *pahar* covered with a *saji* or *tudong saji*. After the

contents have been removed, the plates or bowls should not be cleaned at all; they are sent back on the *pahar* covered with the *saji* or *tudong saji*, but with the lining outside. A *pahar* or an *anak gangsa* or *kaki batil* is used instead of a tray when delivering any light portable article to a person of high standing. The tray may be used only in case of a gift to an inferior person.

When a person is seated on the floor one should not pass behind him without first obtaining permission. When a person asks another to pass him something, he says: *Kirikan hamba barang itu*. When one is handling a *kris*, or any other kind of arms, to another person, the handle should always point towards the latter.

A woman, calling on a noble lady, a sick person, or to see a newly born child, brings gifts of food or fruits, at least some bananas. She is regarded as mean if she does not at least bring some *buah tangan*, fruits. In the case of death the offering is called *melawat*. Live stock, rice, coconuts and other foodstuffs are generally presented during the forty days of mourning.

In Kelantan women only are expected to visit the market. It is not considered the correct thing for a respectable man to do.

An Account of a Journey from the Cameron Highlands
to the East Coast Railway and of a visit to
the Temiar Settlements in the
Valleys
of the Sungai Blatop and S. Ber.

By A. C. BAKER, M.C.S.

(Plate XVI-XVIII).

The South East corner of Ulu Kelantan between the Railway and the Cameron Highlands has, till very recently, been one of the few remaining blank spaces on the map of Malaya. Like all blank spaces on the map, this area has excited a healthy curiosity and has, within the last few years, been visited by several travellers.

Mr. Bellamy-Brown passed from the Telum Valley in Pahang down the Sungai Mering to To' Jagor's Ladang at the junction of the Sungai Brok and the Sungai Cherus. Mr. Edney-Hayter, in the course of a very strenuous expedition, went down the Sungai Brok, a peculiarly difficult bit of country that later travellers have generally avoided. Mr. H. D. Noone, Government Ethnographer of the F.M.S. Museums Department, has spent many weeks visiting the more important Temiar Ladangs in this area and has made a reconnaissance survey of a portion of this area which has been found to be most accurate and helpful, and has composed a very complete vocabulary of the Temiar and other Sakai dialects. Mr. Noone's map with some minor additions and modifications based on our own observations has been adopted as the basis of the sketch map of the route we followed. Mlle. Cuisinier, a very determined and intrepid French lady who has been investigating the Sakai tribes in Ulu Kelantan, has been up as far as the Kuala Ber. Dr. L. W. Evans, Chief Medical Officer, Kelantan, has also visited the area round Jeram Gajah and has even succeeded in persuading many of the Temiars to be vaccinated and to assist in distributing medicines in the more remote Temiar ladangs.

I have had the benefit of the assistance of the notes and sketches which these previous travellers have very generously placed at my disposal and it is largely to them that I owe the possibility of covering a good deal of ground with perhaps less anxiety and fatigue than some of my predecessors.

There still remained an important link between the Cameron Highlands area and the valley of the Ber which had not been investigated.

His Excellency the Governor, when I proposed visiting this area, pointed out that the Cameron Highlands road had been extended by a road suited to light cars through Kuala Terla and

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PLATE XVI.

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Fish Traps on the Sungai Ber.



Temiar Ladang at Sungai Blatop.

Mr. Cowling's estate to within a couple of miles of the Pahang—Kelantan border, and that a preliminary investigation of a possible access route from the Gua Musang Railway Station to the Cameron Highlands road system might be of interest.

With this object in view Mr. T. R. Blackman of the Survey Department and I with the help of Mr. W. G. Stewart, Executive Engineer, Cameron Highlands, collected a party of Temiar carriers near the Pahang—Kelantan boundary. To my great regret Mr. H. D. Noone was prevented by sickness from accompanying us as originally planned; but Yop bin Ahmat, a Collector of the Taiping Museums who had previously visited Temiar ladangs with Mr. Noone, joined our party and proved himself to be a very cheerful and helpful travelling companion.

The 16th and 17th September were spent in organising the party and in climbing Bukit Tajam (5240'). From the summit of Bukit Tajam we were able to take a number of observations covering most of the principal features of the proposed route which was spread out before us. To the north-east the wide and fairly level valley of the Sungai Blatop with numerous Sakai ladangs showing as a more vivid green on the slopes. To the north the isolated range of hills round Gunong Senjort, a very deceptive range which from this distance looked much more easy of access than it was ultimately found to be. The valleys of the Ber and Brok were hidden by intervening ranges, but Bukit Ayam, a long level ridge, showed out clearly to the north-east and defined the position of the rapids of Jeram Gajah.

On the 18th we were awakened before dawn by a strange and penetrating smell to which we were to get well accustomed during the next few days, the smell of a green wood fire and of half roasted Sakai; a very cold night had brought all our Temiar carriers in from their shelters to crouch round our camp fire. We pretended to be asleep and watched through half closed eyes the groups of men, women, and children, shifting about in the firelight: from the first we felt attracted to these kindly well mannered people, there was no elbowing to get the best places, no noisy chattering but a quiet acceptance of one's fair share of hot ashes and pungent smoke.

We left at dawn climbing a fairly steep track to a pass to the west of Gunong Tajam which we named Ginting Ledlad (4800'). We followed a fairly easy ridge down to the junction of two small streams, the Sungai Teyek and the Sungai Ledlad. There was a fair stand of *meranti merah* and of giant bamboos growing at 3500'. Our Temiar carriers collected bunches of wild arecanuts and the scented leaves of a shrub which they called *kuyak* which gives out a pleasant smell when crushed.

We followed the Sungai Ledlad down to its junction with the Sungai Blatop—a lovely spot where two streams join round a large isolated granite boulder.

Continuing down the stream the going became rather difficult: we waded through deep pools and scrambled down steep and slippery slopes: luckily the water was clear and bright sunlight filtered through the overhanging branches.

About noon we left the bed of the stream and cut through a series of abandoned Temiar ladangs, rather heavy going through tangled undergrowth, but our Temiar carriers were bent on a foraging expedition and kept re-appearing from all sides with tapioca roots and sugar canes. We noticed a good deal of serious damage to bamboo clumps made by the bamboo rats (*dekang*) and found the burrows of this animal half covered with dry leaves very easy to trip over.

We reached Kuala Blatop at about 4 p.m. and camped on the river bank (2100'). There is a large Temiar ladang there under the headship of Penghulu Mengkuda with four long houses and about 30 acres of mixed cultivation, mainly tapioca and maize with small plots of sugarcane and tobacco (Plate XVI). Although the Penghulu was with us his people were very shy and ran and hid at our approach; a few gifts to the bolder small boys soon brought them round and we had all the help we needed in building a very comfortable camp. An interested party followed us when we went for an evening swim in the river. The Temiars, though they travel mainly by river and are very skilled in taking rafts over dangerous rapids, are very seldom able to swim at all or at the most can only manage a few scrambling dog strokes; our very indifferent diving and swimming was watched with excited interest.

On the 19th we set out for what turned out to be the hardest day's journey of the whole trip. We followed the north bank of the Sungai Brok down stream for about a mile and then climbed up along the face of an exceedingly steep ridge gaining height painfully, till we reached a pass at a height of 3450'. From the pass we followed an easy elephant track along the ridge and then descended steeply to the Sungai Teresoh where we rested at a small ladang. After another severe climb we crossed the Gunong Senjor range to the east of the summit and after a steep descent over broken ground reached Penghulu Jenang's ladang on the Sungai Ber (1850'), all feeling very exhausted. Luckily we had arranged for light well packed loads in a specially designed carrying tin made to fit the back and provided with broad carrying straps. Even so our Temiar carriers had all they could manage, and my own light rucksack felt a heavier burden than I have ever known it to be on the longest day's climbing in the alps. It was good to see how carefully the Temiars spared their women: a pregnant woman carried nothing beyond her own burden and the other women had only the lightest loads.

We camped by the Sungai Ber, a very lovely site near a much used crossing. In the evening Penghulu Dalam from the next downstream ladang came to visit us with a welcome gift of white hens.

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Temiar Raftsman.

Next day we both found ourselves affected by a rather sharp attack of quinine poisoning and decided to spend a lazy day in camp, a regular network of Sakai tracks led to the river crossing near our camp and we had an excellent opportunity to watch the normal day's work of a Temiar ladang. The Temiar tribe in these valleys are a tribe apart, and even to the unscientific observer very different from any of the other Sakai tribes I have come into contact with.

Mr. Noone has described them as "Nessiots" a primitive Indonesian stock who preceded the round headed Oceanic Mongols. Plates No. XVI and XVII show how magnificently built some of the men are. Most of our carriers were about 5' 6" and had light coloured skins and reddish tints in their black wavy hair; this peculiarity is obviously looked on with special pride as some of them had definitely lighter reddish hair which appeared to have been bleached or dyed. The women were generally shorter but with fine features and a very graceful carriage: we were later to meet the two wives of Penghulu To' Jagor both tall and beautiful women with a very marked sense of their own standing. There was little visible disease amongst the groups we met. We had taken a large stock of itch ointment to distribute but found comparatively few cases which required treatment; in contrast with the Malays the Temiars showed an extraordinary desire to sample European medicines, and the immediate efficacy of iodine on cuts or ammonia on stings or the doses of aspirin, calomel or quinine which we distributed caused an almost embarrassing desire for medicines all along our route.

I think the most interesting feature in the Temiar life as we observed it was their obvious happiness and good fellowship. There was no shortage of food, small foraging parties were constantly going out and returning with fruits, especially langsat and rambutans, and fish from the stream. There was an abundant supply of tapioca roots and maize and millet pounded into a fine paste called sekoi. Parties of women came down to the stream to fetch water in lengths of bamboos and in the evening men brought back quantities of dry firewood. Throughout the day paste called sekoi. Parties of women came down to the stream parties of visitors came and went from the neighbouring ladangs and were freely entertained. A Temiar has his own few personal possessions which are highly treasured and carried wherever he goes in a small rotan basket (*ambang*), but for the rest food and labour are shared ungrudgingly.

Children played about making small rafts and taking them down the shallow rapids and we noticed one boy with a beautifully finished and balanced light casting rod made from a single *nibong* rib with a line made from the *jerlang* fibre and rings of plated rotan. There was no reel and the spare line was wound on a separate disk.

The evening was given over to song and endless talk; the Temiar may be primitive but with him life is certainly not "nasty, brutish and short."

On 21st September we made an early start and had a fairly strenuous time working our way down the valley of the Ber partly wading down the stream which was at times awkwardly deep and partly through a succession of Temiar ladangs. We camped at the junction of the Ber and the Brok near Penghulu Dalam's ladang.

Next morning the 22nd we left with Penghulu To' Jagor and his people who had come to meet us and after a few more miles of river scrambling we reached a sand bank where light bamboo rafts were built for the next stage of our journey.

I can recollect few more utterly blissful hours than the rest of that afternoon as we lay wet, weary and bruised on rafts that slid easily along a clear fast flowing stream. At intervals we went through deep pools where fish could be seen darting in and out. In this stretch of the river the Temiar have built a very large well constructed fish trap of the type known as *meriang* the principle of which is to drive the fish on to a series of sloping platforms which are then heaved above water. *Sebarau* is sometimes taken but more often *klah*, *kerai*, *kendrap* and *lampan*.

Penghulu To' Jagor insisted on the rafts being unloaded when going over the rapids but the Temiar crews handled their rafts boldly relying more on a long steering sweep at both bow and stern than on the more usual method of fending off with poles.

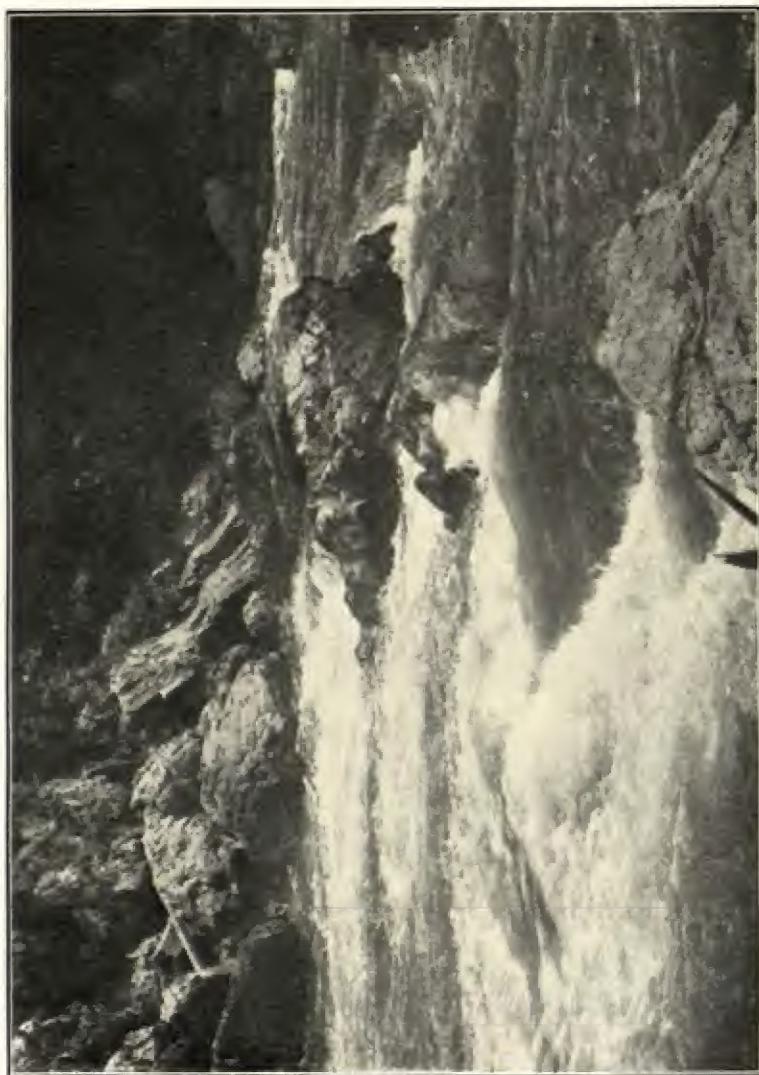
In the afternoon we reached To' Jagor's ladang at the junction of Kuala Cherus. Penghulu To' Jagor who is well-known in all the valleys above the Jeram Gajah is a most interesting character; a fine upstanding man who carries his years easily, he has as a young man wandered fairly far afield and speaks Malay easily; but for many years he has not left his ladang on the Sungai Ber where he keeps a strict standard of fatherly discipline. No blow pipes are allowed as he considers that the *upas* poison used on the arrows causes sickness amongst those who handle it. To' Jagor's ladang is exceptionally well cultivated; besides the usual Temiar crops a good deal of hill padi is grown as well as vegetables and ever flowering shrubs.

To' Jagor has two wives, one young and comely who travels with him and one older woman tall and stately with a great natural sense of dignity who looks after the long house in his absence. This long house holds at least 100 people grouped in family parties round five fire places. There are no partitions and necessity seems to have produced a very high sense of honesty and morality.

We now began to feel that our stores would be sufficient for the rest of the journey and decided to give a party; messengers carried the good news and guests came in from all round. Twenty

PLATE XVIII.

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Jeram Gajah Rapids.

gantangs of rice, ten enormous tins of so called sardines, quantities of tobacco, cigarettes, sugar and onions were consumed besides tapioca and fowls which we had purchased. Our guests stayed till 5 a.m., so it must have been a good party. Singing and dancing went on all night. The orchestra consisted of a series of bamboos tapped against a log and giving a bass or treble note. Usually a man sings the first line and holds the last note whilst the line is repeated by the women but other songs were sung in unison. The songs vary greatly in character sometimes a solemn incantation which all took seriously, sometimes a jolly noisy song with rousing chorus and at other times a plaintive wailing with a feeling of the abandonment of death in it.

The men's dancing with slow exact stamping movements is not unlike the Malay Zapin dance. The women's dances consisted mainly in a graceful posturing of body and arms. The symbolism was clear but had all the natural dignity of life, love and birth and was far removed from degenerate imitations. When the night was far advanced To' Jagor's elder wife came forward and showed us how they danced when she was young and in the dignity and decision of her movements outshone them all.

Next morning we were feeling exhausted but our Temiar guests appeared as fresh as ever and rafted us down the stream by now wider and more placid as far as Jeram Gajah (Plate XVIII). Here the river goes over a series of three rapids which are almost falls and a very dangerous eddy in the pool below surges up against a great barrier of rocks set half across the river.

The rafts were unloaded, made narrower, strengthened and let down by the aid of rattan ropes.

At the Jeram Gajah we were met with the first and only difficulty with our carriers. We had up to now changed carriers at every ladang so as to take no one too far from his own home. A messenger had been sent to fetch carriers from Penghulu Stia's ladang below the Jeram Gajah falls, but they stuck there and would not come up, whilst To' Jagor's men showed no desire to go down. Eventually To' Jagor's authority decided then to move, but there is an obvious break in tribal organisation though not in racial characteristic at the falls; above the falls Temiars had obviously been one happy family passing from ladang to ladang and holding all things in common; below the falls there is obvious watchfulness if not definite hostility and each party kept severely apart.

Penghulu Stia had prepared for our use a larger raft and we went down past his ladang with the idea of gaining as much ground as possible that evening. The weather which had been wonderfully fine up to then looked like breaking and we wanted to reach Kuala Betis next day.

We reached a suitable camping ground at dusk a little above Sungai Sungkai where we passed the only miserable hours of our

journey. A terrific thunder storm broke before we had time to build any shelter: all we could do was to slip out of our cold drenched clothes put on thick woollen bath kit and at intervals wring it out and put it on again, as we sat for some hours on the sand bank with the driving rain churning up river and land all round us. It was late that night before the rain moderated and we were able to make camp and get a big fire burning.

On Sunday the 24th we had an easy uneventful day rafting down the river to Kuala Betis; we began to meet the first Chinese *jelutong* workers and passed scattered Malay kampongs along the river bank. At Kuala Betis where we spent the night, there is a considerable Malay kampung with about 30 houses.

From Kuala Betis to Gua Musang Railway Station is about 22 miles along a fairly well defined track through easy undulating country: we reached Gua Musang by 5 in the evening after visiting on the way a very efficient Chinese managed gold mine at Panggong Lalat which turns out about 70 tahils of gold a month.

During the course of our journey we collected a certain number of geological specimens which have been identified with the assistance of the Director of Geological Surveys. We also had the advantage of having the assistance of the geological notes of Mr. Sasse, a Mining Prospector who has visited the lower ridges of Sungai Brok.

The granite formation of the Cameron Highlands continue down the Sungai Ledlad as far as the junction of the Sungai Ledlad and Sungai Blatop. Below this point and all over the Gunong Senjor area though granite predominates there are extensive outcrops of mica-schist. About a mile and half below the Kuala Brok there is a considerable area of brecciated granite, below this point the granite is displaced by sedimentary rocks mainly schists. Above Jeram Gajah the river bed is mainly quartzite and Jeram Gajah rapids are caused by huge boulders of vitreous quartzite. Below the Jeram the sedimentary shales are less disturbed there was a short stretch of lime stone above Sungai Sungkai. Between Kuala Betis and Gua Musang we re-enter the predominantly lime stone area, but the gold mine at Padang Lalat is the edge of a tongue of granite mainly in the form of huge detached boulders which stretch into the lime stone area. We were informed that alluvial gold had been found in small quantities above the Jeram Gajah and that tin oxide deposits are found freely in the bed of the Sungai Brok. We received very definite information from several sources of tin deposits between Sungai Betis and the lime stone range of Bukit Ayam to the west.

We were disappointed in not being able to make any really useful identifications in the forests we went through, but so far as we could judge there were fair stands of *meranti*, *merbau*, *terantang*, *medang* and *seraya*. We noticed no *chengai* or at any rate failed to identify it and we recognised only a few *jelutong*

PERAK



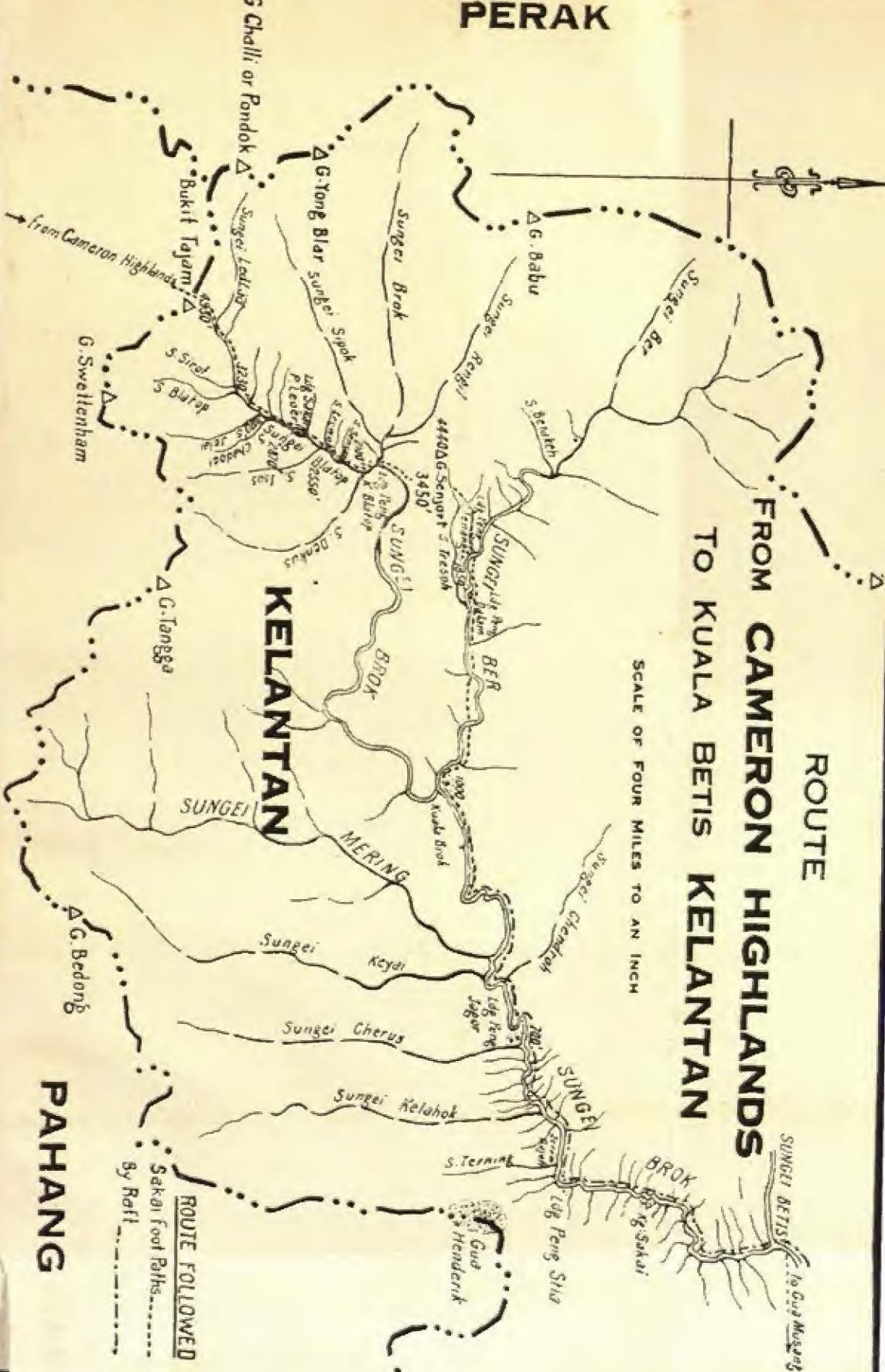
ROUTE FROM CAMERON HIGHLANDS TO KUALA BETIS KELANTAN

SCALE OF FOUR MILES TO AN INCH

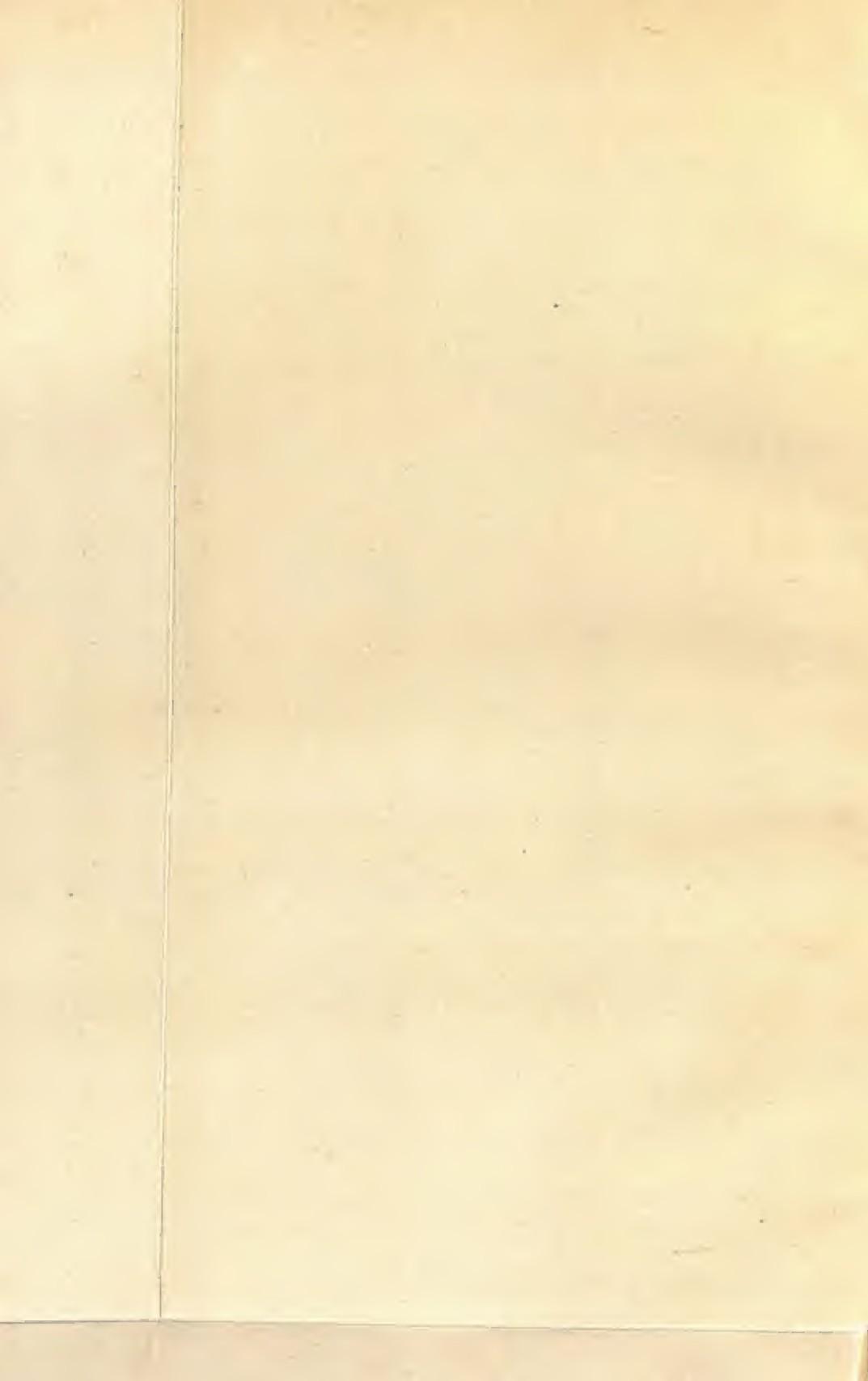
ROUTE

SUNGAI BETIS to Gua Musang

KELANTAN



PAHANG



trees; clumps of bamboos were abundant every where. We were glad to find a fair number of the *ngeram* along the river banks, a tree which is being carefully preserved in this State as its roots protect the river banks from erosion and its deep shade keeps back *resam* and undergrowth.

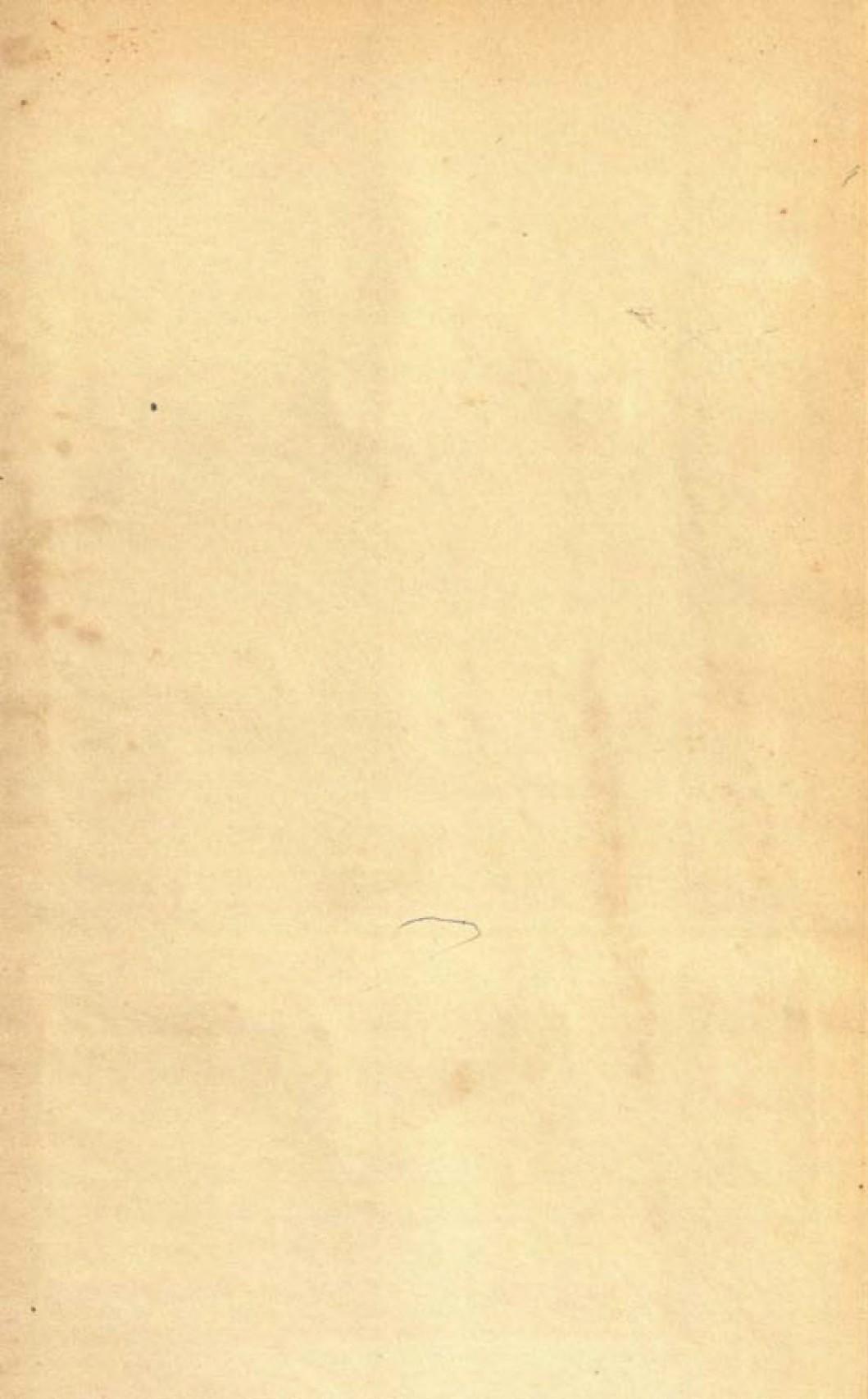
The whole area between the Pahang and Kelantan boundary and the Sungai Blatop should provide a very valuable extension to the Cameron Highlands area and would appear to be suited to the same type of agriculture. It is a wide valley with small areas of flat land, but in no sense a plateau and any applicants for land in this area will have to expect to meet with the ups and downs of the Cameron Highlands area. The area between Kuala Betis and Gua Musang is reasonably flat; the soil appears to be excellent, and there is good rail and river access which it is hoped to improve shortly by the construction of a light road; there are about 200 square miles in this area which should be suited to immediate agriculture development.

I believe that the route we followed is substantially the easiest means of access by which the road system of the Cameron Highlands and the East coast railway could ultimately be linked up by an East to West cross route, but the area round Gunong Senjor between the Sungai Ber and the Sungai Brok will always be a most difficult section of the route.

The most abiding memory of our trip will be our contact with the Temiar tribe. I estimate the population of the area we went through at about 3,000. They are I think clearly a superior race which at sometime under pressure from other waves of invaders have sought refuge in those rich and inaccessible valleys and have kept them jealously to themselves. I hope that whatever future development awaits this area adequate reserves between Kuala Cherus and the upper ridges of the Ber will be set aside for their use if they stick to their present form of life. On the other hand if their confidence can be gained I see no reason why they should not be capable of development and of adding one more virile race to the many races of Malaya. My companion in this trip, Mr. Blackman, a New Zealander, was struck at once with the resemblance in character between the Temiars and the Maoris; perhaps the same future may be open to them; if so I hope they will develop without losing their good tempered open handed manly form of life.



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